

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

Shenzhen Pengchu Industry Co., Ltd.

Power Supply

Model: PC-XXXYYY(XXX=050-500 means output voltage 5V -50V, Step is 0.5V; YYY=050-500 means output current 5A-50A, Step is 0.1A

Prepared For : Shenzhen Pengchu Industry Co., Ltd.
Office 17D, North of Hubei Building, Binhe Rd NO. 9003, Futian district, Shenzhen, Guangdong province, China

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Date of Test: Mar. 01, 2014 to Mar. 06, 2014

Date of Report: Mar. 06, 2014

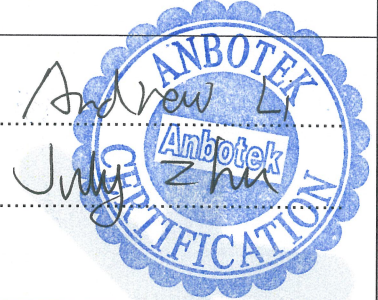
Report Number: 201403680S

TEST REPORT

EN 60950-1

**Information technology equipment – Safety –
Part 1: General requirements**

Reference No. : 201403680S
 Compiled by (+ signature)..... : Andrew Li/ Project Engineer
 Approved by (+ signature)..... : July Zhu / Project Manager
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Testing laboratory

Name..... : Shenzhen Anbotek Compliance Laboratory Limited
 Address : 1/F., Building1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China
 Testing location : Same as above

Client

Name..... : Shenzhen Pengchu Industry Co., Ltd.
 Address : Office 17D, North of Hubei Building, Binhe Rd NO. 9003, Futian district, Shenzhen, Guangdong province, China

Test specification

Standard : EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
 Test procedure : Compliance with
 EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
 Procedure deviation..... : N.A.
 Non-standard test method..... : N.A.

Test item

Description..... : Power Supply
 Trademark :



Model and/or type reference : PC-XXXXYYY(XXX = 050-500 means output voltage 5V -50V, Step is 0.5V; YYY = 050-500 means output current 5A-50A, Step is 0.1A
 Manufacturer..... : Shenzhen Pengchu Industry Co., Ltd.
 Address : Office 17D, North of Hubei Building, Binhe Rd NO. 9003, Futian district, Shenzhen, Guangdong province, China
 Factory..... : Shenzhen Pengchu Industry Co., Ltd.
 Address : Office 17D, North of Hubei Building, Binhe Rd NO. 9003, Futian

Rating(s)..... : Input: AC 100-240V, 50/60Hz, 5A
Output : DC 5V, 50A (for model PC-050500)
DC 13V, 31A (for model PC-130310)
DC 24V, 17A (for model PC-240170)
DC 48V, 10.5A (for model PC-480105)

Anbotek

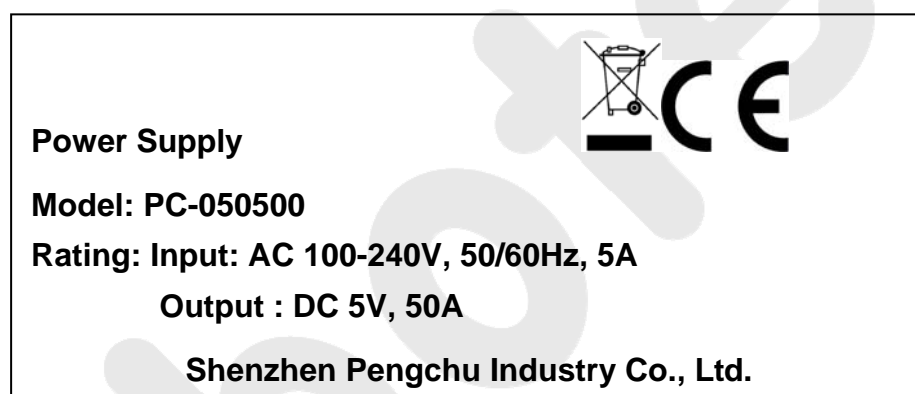
Test item particulars	
Equipment mobility	<input checked="" type="checkbox"/> Movable <input type="checkbox"/> Hand-held <input type="checkbox"/> Transportable <input type="checkbox"/> Stationary <input type="checkbox"/> For building-in <input type="checkbox"/> Direct plug-in
Connection to the mains.....	<input checked="" type="checkbox"/> Pluggable equipment <input checked="" type="checkbox"/> Type A <input type="checkbox"/> Type B <input type="checkbox"/> Permanent connection <input type="checkbox"/> Detachable power supply cord <input type="checkbox"/> Non-detachable power supply cord <input type="checkbox"/> Not directly connected to the mains <input type="checkbox"/> built-in component, consider in end system
Operating condition	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Rated operating / resting time:
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	±10%
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V)	N.A.
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (A)	16A
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IPX0
Altitude during operation (m)	2000
Altitude of test laboratory (m)	<500
Mass of equipment (kg)	
Possible test case verdicts	
- test case does not apply to the test object	N (N.A.)
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	Mar. 01, 2014 to Mar. 06, 2014
Date(s) of performance of tests.....	Mar. 06, 2014
General remarks	
This test report shall not be reproduced except in full without the written approval of the testing laboratory.	
The test results presented in this report relate only to the item tested.	
"(see remark #)" refers to a remark appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a point is used as the decimal separator.	

General product information

1. The power supply, Class I equipment which is used for information technology equipment.
2. When installing the power supply all requirements of the mentioned standard must be fulfilled
3. The maximum operating temperature is 50°C.
4. Clearance distance was evaluated for operating altitude up to 2000m above sea level.
5. They models have the similar electrical construction except the model name is different, Unless otherwise specified, the model PC-050500(max. Output current) was chosen as representative model to perform all the tests.

Copy of marking plate(s)

Rating label for mode PC-050500



Summary of testing

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.


EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict

1	GENERAL		P
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1.5	Components		P
1.5.1	General	(see appended table 1.5.1)	P
	Comply with IEC 60950-1 or relevant component standard	Components, which were found to affect safety aspects comply with the requirements of this aspects of the relevant IEC component standards. (See appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Components, which are certified to IEC or national standards, are applied correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
1.5.3	Thermal controls	No thermal controls provided	N
1.5.4	Transformers	See Annex C	P
1.5.5	Interconnecting cables		P
1.5.6	Capacitors bridging insulation	Approved X, Y capacitor used	P
1.5.7	Resistors bridging insulation		P
1.5.7.1	Resistors bridging functional, basic or supplementary insulation	Functional insulation only	P
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N
1.5.8	Components in equipment for IT power systems	TN power system.	N
1.5.9	Surge suppressors		P
1.5.9.1	General		P
1.5.9.2	Protection of VDRs		P
1.5.9.3	Bridging of functional insulation by a VDR		P
1.5.9.4	Bridging of basic insulation by a VDR		N
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict

1.6	Power interface		P
1.6.1	AC power distribution systems	TN and TT	P
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment	This appliance is not a hand-held equipment.	N
1.6.4	Neutral conductor		P

1.7	Marking and instructions		P
1.7.1	Power rating and identification markings		P
1.7.1.1	Power rating marking		P
	Multiple mains supply connections		N
	Rated voltage(s) or voltage range(s) (V).....:	100-240V	P
	Symbol for nature of supply, for d.c. only.....:	~	N
	Rated frequency or rated frequency range (Hz) ..:	50/60Hz	P
	Rated current (mA or).....:	5A Max.	P
1.7.1.2	Identification markings		
	Manufacturer's name or trade-mark or identification mark	Shenzhen Pengchu Industry Co., Ltd. Trademark: 	P
	Model identification or type reference	PC-050500	P
	Symbol for Class II equipment only.....:	Class I equipment	N
	Other markings and symbols		N
1.7.1.3	Use of graphical symbols		P
1.7.2	Safety instructions and marking		P
1.7.2.1	General		P
1.7.2.2	Disconnect devices	No such devices	N
1.7.2.3	Over current protective device		N
1.7.2.4	IT power distribution systems		N
1.7.2.5	Operator access with a tool		N
1.2.7.6	Ozone	The equipment does not produce Ozone.	N
1.7.3	Short duty cycles	Equipment is designed for	N

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
		continuous operation.	
1.7.4	Supply voltage adjustment	Input not adjustable.	N
	Methods and means of adjustment; reference to installation instructions		N
1.7.5	Power outlets on the equipment	No such device	N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)	"F1 T15A 250V"	P
1.7.7	Wiring terminals		P
1.7.7.1	Protective earthing and bonding terminals		P
1.7.7.2	Terminals for a.c. mains supply conductors		N
1.7.7.3	Terminals for d.c. mains supply conductors		N
1.7.8	Controls and indicators		P
1.7.8.1	Identification, location and marking		P
1.7.8.2	Colours		N
1.7.8.3	Symbols according to IEC 60417		N
1.7.8.4	Markings using figures		N
1.7.9	Isolation of multiple power sources	Only one supply voltage provided.	N
1.7.10	Thermostats and other regulating devices	No such regulating devices	N
1.7.11	Durability	The marking was rubbed with cloth soaked with water for 15 sec. and then again for 15 sec. with the cloth soaked with petroleum spirit. After this test, the marking still legible and durable.(see appended tables 1.7.11)	P
1.7.12	Removable parts	No such parts	N
1.7.13	Replaceable batteries	No batteries	N
	Language(s)		--
1.7.14	Equipment for restricted access locations.....	Unit is not limited to be used in restricted access locations.	N
2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas		P

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
2.1.1.1	Access to energized parts		N
	Test by inspection		N
	Test with test finger (Figure 2A)		N
	Test with test pin (Figure 2B)		N
	Test with test probe (Figure 2C)		N
2.1.1.2	Battery compartments	No TNV present.	N
2.1.1.3	Access to ELV wiring	No battery compartment.	N
	Working voltage (V _{peak} or V _{rms}); minimum distance through insulation (mm)		--
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage wiring in operator accessible area.	N
2.1.1.5	Energy hazards.....	Built-in component, considered in end system	N
2.1.1.6	Manual controls	No such controls.	N
2.1.1.7	Discharge of capacitors in equipment	X-Cap. (CX1): 1uF; X-Cap. (CX2): 1uF	P
	Measured voltage (V); time-constant (s)	Max.20V after 1 second, Limit: 290Vx37%=151.72V	--
2.1.1.8	Energy hazards – 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	Audio amplifiers		N
2.1.2	Protection in service access areas	No service access area.	N
2.1.3	Protection in restricted access locations	No restricted access location.	N

2.2	SELV circuits		P
2.2.1	General requirements		P
2.2.2	Voltages under normal conditions (V)	Within SELV limits	P
2.2.3	Voltages under fault conditions (V)	Within SELV limits	P
2.2.4	Connection of SELV circuits to other circuits	SELV circuit only for connection to other SELV circuits.	P

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict

2.3	TNV circuits		N
2.3.1	Limits	No TNV circuits	N
	Type of TNV circuits		--
2.3.2	Separation from other circuits and from accessible parts		N
2.3.2.1	General requirements		N
2.3.2.2	Protection by basic insulation		N
2.3.2.3	Protection by earthing		N
2.3.2.4	Protection by other constructions		N
2.3.3	Separation from hazardous voltages		N
	Insulation employed.....		--
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed.....		--
2.3.5	Test for operating voltages generated externally		N

2.4	Limited current circuits		P
2.4.1	General requirements	Primary and secondary circuits bridged by Y1 type capacitor (CY2). The pin connected with secondary circuits was disconnected and non-inductive resistor of 2kΩ was connected between this pin and earth.	P
2.4.2	Limit values	0.7mA	P
	Frequency (Hz)	60Hz	--
	Measured current (mA)	0.14	--
	Measured voltage (V).....	264V	--
	Measured circuit capacitance (nF or μF)	CY2:2200pF	--
2.4.3	Connection of limited current circuits to other circuits	Connect to SELV circuit only	P

2.5	Limited power sources		N
	a) Inherently limited output		N
	b) Impedance limited output		N
	c) Regulating network limited output under normal		N

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Clause	Requirement – Test	Result - Remark	Verdict

	operating and single fault condition		
	Use of integrated circuit (IC) current limiters		N
	d) Overcurrent protective device limited output		N
	Max. Output voltage (V), max. Output current (A), max. Apparent power (VA).....:	(see appended table 2.5)	--
	Current rating of overcurrent protective device (A):		--

2.6	Provisions for earthing and bonding		P
2.6.1	Protective earthing		P
2.6.2	Functional earthing		N
	Use of symbol for functional earthing		N
2.6.3	Protective earthing and protective bonding conductors		P
2.6.3.1	General		P
2.6.3.2	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG		--
2.6.3.3	Size of protective bonding conductors		N
	Rated current (A), cross-sectional area (mm ²), AWG		--
	Protective current rating (A), cross-sectional area (mm ²), AWG		--
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min)	Resistance: Max. 1.3mΩ; Test current: 40A for 2min	P
2.6.3.5	Colour of insulation.....:		N
2.6.4	Terminals		P
2.6.4.1	General		P
2.6.4.2	Protective earthing and bonding terminals		P
	Rated current (A), type, nominal thread diameter (mm)		--
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N
2.6.5	Integrity of protective earthing		N
2.6.5.1	Interconnection of equipment		N
2.6.5.2	Components in protective earthing conductors		N

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
	and protective bonding conductors		
2.6.5.3	Disconnection of protective earth		P
2.6.5.4	Parts that can be removed by an operator		P
2.6.5.5	Parts removed during servicing		P
2.6.5.6	Corrosion resistance	See Annex J	N
2.6.5.7	Screws for protective bonding		P
2.6.5.8	Reliance on telecommunication network or cable distribution system		N

2.7	Overcurrent and earth fault protection in primary circuits		P
2.7.1	Basic requirements	Current fuse “F1”integrated in the equipment	P
	Instructions when protection relies on building installation		N
2.7.2	Faults not simulated in 5.3.7		N
2.7.3	Short-circuit backup protection	By building installation	P
2.7.4	Number and location of protective devices	Over-current protection by single.	P
2.7.5	Protection by several devices		P
2.7.6	Warning to service personnel.....	.	P

2.8	Safety interlocks		N
2.8.1	General principles	No safety interlocks.	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
	Protection against extreme hazard		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches, relays and their related circuits		N
2.8.7.1	Separation distances for contact gaps and their related circuits (mm)		N
2.8.7.2	Overload test		N

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict

2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N

2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	The insulation materials provided in the equipment with adequate thickness and adequate creepage distance over their surface and clearance distance through air.	P
2.9.2	Humidity conditioning	48h	P
	Relative humidity (%), temperature (°C)	93%R.H	--
2.9.3	Grade of insulation	30°C	P
2.9.4	Separation from hazardous voltages	The adequate levels of safety insulation is provided and maintained to comply with the requirements of this standard	P
	Method(s) used	See below.	--

2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General		P
2.10.1.1	Frequency	Considered	P
2.10.1.2	Pollution degrees	Pollution Degree 2.	P
2.10.1.3	Reduced values for functional insulation	The functional insulation complied with clause 5.3.4.	P
2.10.1.4	Intervening unconnected conductive parts	Considered.	P
2.10.1.5	Insulation with varying dimensions	.	N
2.10.1.6	Special separation requirements		N
2.10.1.7	Insulation in circuits generating starting pulses		N
2.10.2	Determination of working voltage	(see appended table 2.10.2)	P
2.10.2.1	General		P
2.10.2.2	RMS working voltage	T1: 250V	P
2.10.2.3	Peak working voltage	T1: 484V	P

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
2.10.3	Clearances		P
2.10.3.1	General		P
2.10.3.2	Mains transient voltages		P
	a) AC mains supply	2500Vpk	P
	b) Earthed d.c. mains supplies		N
	c) Unearthed d.c. mains supplies		N
	d) Battery operation		N
2.10.3.3	Clearances in primary circuits	See appended table 2.10.3 and 2.10.4.	P
2.10.3.4	Clearances in secondary circuits		N
2.10.3.5	Clearances in circuits having starting pulses		N
2.10.3.6	Transients from a.c. mains supply		N
2.10.3.7	Transients from d.c. mains supply		N
2.10.3.8	Transients from telecommunication networks and cable distribution systems		N
2.10.3.9	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	Creepage distances	See appended table 2.10.3 and 2.10.4	P
2.10.4.1	General	Considered	P
2.10.4.2	Material group and comparative tracking index		P
	CTI tests	Material group IIIb is assumed to be used	--
2.10.4.3	Minimum creepage distances	(see appended table 2.10.3 and 2.10.4)	P
2.10.5	Solid insulation	See below.	P
2.10.5.1	General		P
2.10.5.2	Distances through insulation	See appended table 2.10.5	P
2.10.5.3	Insulating compound as solid insulation		P
2.10.5.4	Semiconductor devices		P

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
2.10.5.5	Cemented joints		N
2.10.5.6	Thin sheet material	(see appended table 2.10.3 and 2.10.4)	P
2.10.5.7	Separable thin sheet material	Insulation tape for T1	P
	Number of layers (pcs)..... :		--
2.10.5.8	Non-separable thin sheet material	Not used.	N
2.10.5.9	Thin sheet material – standard test procedure	Not used.	N
	Electric strength test		--
2.10.5.10	Thin sheet material – alternative test procedure	(see appended table 2.10.5)	P
	Electric strength test	(see appended table 2.10.5)	--
2.10.5.11	Insulation in wound components		N
2.10.5.12	Wire in wound components	(see appended table 1.5.1)	P
	Working voltage :		P
	a) Basic insulation not under stress :		N
	b) Basic, supplementary, reinforced insulation :		N
	c) Compliance with Annex U :		P
	Two wires in contact inside wound component; angle between 45° and 90° :	Secondary insulated wires crossing other primary wires at an angle between 45° and 90° protected against mechanical stress by insulating tape.	P
2.10.5.13	Wire with solvent-based enamel in wound components	.	N
	Electric strength test		--
	Routine test		N
2.10.5.14	Additional insulation in wound components		P
	Working voltage :		P
	- Basic insulation not under stress :		N
	- Supplementary, reinforced insulation :	Comply with 2.10.5.6	P
2.10.6	Construction of printed boards	See below.	P
2.10.6.1	Uncoated printed boards	(see appended table 2.10.3 and 2.10.4)	P
2.10.6.2	Coated printed boards		N
2.10.6.3	Insulation between conductors on the same inner	(see appended table 2.10.3 and 2.10.4)	N

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
	surface of a printed board		
2.10.6.4	Insulation between conductors on different layers of a printed board		N
	Distance through insulation	(see appended table 2.10.5)	N
	Number of insulation layers (pcs)..... : 1		N
2.10.7	Component external terminations	(see appended table 2.10.3 and 2.10.4)	N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Sample preparation and preliminary inspection		N
2.10.8.2	Thermal conditioning		N
2.10.8.3	Electric strength test	(see appended table 5.2)	N
2.10.8.4	Abrasion resistance test		N
2.10.9	Thermal cycling		N
2.10.10	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11	Tests for semiconductor devices and cemented joints		N
2.10.12	Enclosed and sealed parts		N

3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection		P
3.1.2	Protection against mechanical damage		P
3.1.3	Securing of internal wiring		P
3.1.4	Insulation of conductors	(see appended table 5.2)	P
3.1.5	Beads and ceramic insulators		N
3.1.6	Screws for electrical contact pressure		N
3.1.7	Insulating materials in electrical connections		N
3.1.8	Self-tapping and spaced thread screws		N
3.1.9	Termination of conductors		P
	10 N pull test		P
3.1.10	Sleeving on wiring		N
3.2	Connection to a mains supply		P

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict
3.2.1	Means of connection		P
3.2.1.1	Connection to an a.c. mains supply		P
3.2.1.2	Connection to a d.c. mains supply		N
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter of cable and conduits (mm)		--
3.2.4	Appliance inlets		P
3.2.5	Power supply cords		N
3.2.5.1	AC power supply cords		N
	Type		--
	Rated current (A), cross-sectional area (mm ²), AWG		--
3.2.5.2	DC power supply cords		N
3.2.6	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N)		--
	Longitudinal displacement (mm)		--
3.2.7	Protection against mechanical damage		N
3.2.8	Cord guards		N
	Diameter or minor dimension D (mm); test mass (g)		--
	Radius of curvature of cord (mm).....		--
3.2.9	Supply wiring space		N

3.3	Wiring terminals for connection of external conductors		N
3.3.1	Wiring terminals	No such wiring terminals	N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm ²)		--
3.3.5	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter		--

EN 60950-1/Am1			
Clause	Requirement – Test	Result - Remark	Verdict

	(mm)		
3.3.6	Wiring terminal design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N

3.4	Disconnection from the mains supply		P
3.4.1	General requirement		P
3.4.2	Disconnect devices	AC inlet as disconnect devices	P
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords	No such switch	N
3.4.6	Number of poles – single-phase and d.c. equipment		P
3.4.7	Number of poles – three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources	No multiple power sources	N

3.5	Interconnection of equipment		P
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits	Connect to SELV circuits	P
3.5.3	ELV circuits as interconnection circuits	No ELV circuit	N
3.5.4	Data ports for additional equipment		N

4	PHYSICAL REQUIREMENTS		N
4.1	Stability		N
	Angle of 10°	Weight less than 7.0kg	N
	Test force (N)		N

4.2	Mechanical strength		P
4.2.1	General		P

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Clause	Requirement – Test	Result - Remark	Verdict

	Rack-mounted equipment.		P
4.2.2	Steady force test, 10 N		P
4.2.3	Steady force test, 30 N		N
4.2.4	Steady force test, 250 N	Tested on top, side, bottom enclosure, no damage.	P
4.2.5	Impact test		P
	Fall test		N
	Swing test		N
4.2.6	Drop test; height (mm)		N
4.2.7	Stress relief test		N
4.2.8	Cathode ray tubes		N
	Picture tube separately certified	(See separate test report or attached certificate)	N
4.2.9	High pressure lamps		N
4.2.10	Wall or ceiling mounted equipment; force (N)		N

4.3	Design and construction		P
4.3.1	Edges and corners		N
4.3.2	Handles and manual controls; force (N).....		N
4.3.3	Adjustable controls		N
4.3.4	Securing of parts		P
4.3.5	Connection by plugs and sockets		N
4.3.6	Direct plug-in equipment		N
	Torque		--
	Compliance with the relevant mains plug standard		N
4.3.7	Heating elements in earthed equipment	No heating elements provided.	N
4.3.8	Batteries	No batteries	N
	- Overcharging of a rechargeable battery		N
	- Unintentional charging of a non-rechargeable battery		N
	- Reverse charging of a rechargeable battery		N
	- Excessive discharging rate for any battery		N

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Clause	Requirement – Test	Result - Remark	Verdict

4.3.9	Oil and grease	No oil and grease	N
4.3.10	Dust, powders, liquids and gases	No dust, powders, liquids and gases	N
4.3.11	Containers for liquids or gases	No such containers	N
4.3.12	Flammable liquids	No flammable liquid	N
	Quantity of liquid (l)		N
	Flash point (°C)		N
4.3.13	Radiation		N
4.3.13.1	General		N
4.3.13.2	Ionizing radiation	No ionizing radiation	N
	Measured radiation (pA/kg)		--
	Measured high-voltage (kV)		--
	Measured focus voltage (kV)		--
	CRT markings		--
4.3.13.3	Effect of ultraviolet (UV) radiation on materials	No ultraviolet radiation	N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N
4.3.13.5	Lasers (including laser diodes) and LEDs		N
4.3.13.5.1	Lasers (including laser laser diodes)		N
	Laser class		--
4.3.13.5.2	Light emitting diodes (LEDs)		--
4.3.13.6	Other types		N

4.4	Protection against hazardous moving parts		P
4.4.1	General		P
4.4.2	Protection in operator access areas	Can not access to the moving fan blades	P
	Household and home/office document/media shredders		N
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		N
4.4.5	Protection against moving fan blades		P

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Clause	Requirement – Test	Result - Remark	Verdict

4.4.5.1	General		P
	Not considered to cause pain or injury. a).....:	Under normal operation: N=9849, K=278.9 N/15000+K/2400=0.77	P
	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	The moving fan blade classified as 4.4.5.1a)	N
	Use of symbol or warning		N

4.5	Thermal requirements		P
4.5.1	General		P
4.5.2	Temperature tests		P
	Normal load condition per Annex L		--
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat	(see appended table 4.5.5)	P

4.6	Openings in enclosures		N
4.6.1	Top and side openings		N
	Dimensions (mm)		--
4.6.2	Bottoms of fire enclosures		N
	Construction of the bottom, dimensions (mm) .:		--
4.6.3	Doors or covers in fire enclosures		N
4.6.4	Openings in transportable equipment		N
4.6.4.1	Constructional design measures		N
	Dimensions (mm)		--
4.6.4.2	Evaluation measures for larger openings		N
4.6.4.3	Use of metallized parts		N
4.6.5	Adhesives for constructional purposes		N
	Conditioning temperature (°C), time (weeks).....:		--

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Clause	Requirement – Test	Result - Remark	Verdict

4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame		P
	Method 1, selection and application of components wiring and materials	(see appended table 4.7)	P
	Method 2, application of all of simulated fault condition tests		N
4.7.2	Conditions for a fire enclosure		P
4.7.2.1	Parts requiring a fire enclosure		P
4.7.2.2	Parts not requiring a fire enclosure		N
4.7.3	Materials		P
4.7.3.1	General	PCB: V-0	P
4.7.3.2	Materials for fire enclosures		N
4.7.3.3	Materials for components and other parts outside fire enclosures		N
4.7.3.4	Materials for components and other parts inside fire enclosures	Min. V-2	P
4.7.3.5	Materials for air filter assemblies		N
4.7.3.6	Materials used in high-voltage components		N

5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		P
5.1.1	General		P
5.1.2	Configuration of equipment under test (EUT)		N
5.1.2.1	Single connection to an a.c. mains supply		N
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		N
5.1.3	Test circuit		P
5.1.4	Application of measuring instrument	Annex D	P
5.1.5	Test procedure		P
5.1.6	Test measurements		P
	Supply voltage (V)	264V, 60Hz	--
	Measured touch current (mA)	(see appended table 5.1.6)	--

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Clause	Requirement – Test	Result - Remark	Verdict
	Max. Allowed touch current (mA)		--
	Measured protective conductor current (mA)		--
	Max. Allowed protective conductor current (mA) .:		--
5.1.7	Equipment with touch current exceeding 3,5 mA		N
5.1.7.1	General		N
5.1.7.2	Simultaneous multiple connections to the supply		N
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		N
	Supply voltage (V)		--
	Measured touch current (mA)		--
	Max. Allowed touch current (mA)		--
5.1.8.2	Summation of touch currents from telecommunication networks		N
	a) EUT with earthed telecommunication ports:		N
	b) EUT whose telecommunication ports have no reference to protective earth		N

5.2	Electric strength		P
5.2.1	General	(see appended table 5.2)	P
5.2.2	Test procedure	(see appended table 5.2)	P

5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	(see appended Annex B)	N
5.3.3	Transformers	(see appended Annex C)	P
5.3.4	Functional insulation.....:	By short circuits	P
5.3.5	Electromechanical components	No such components	N
5.3.6	Audio amplifiers in ITE		N
5.3.7	Simulation of faults		P
5.3.8	Unattended equipment		P

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Clause	Requirement – Test	Result - Remark	Verdict
5.3.9	Compliance criteria for abnormal operating and fault conditions		P
5.3.9.1	During the tests		P
5.3.9.2	After the tests		P
6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Supply voltage (V)		--
	Current in the test circuit (mA)		--
6.1.2.2	Exclusions		N
6.2	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1	Separation requirements		N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test		N
6.2.2.2	Steady-state test		N
6.2.2.3	Compliance criteria		N
6.3	Protection of the telecommunication wiring system from overheating		N
	Max. Output current (A)		--
	Current limiting method		--
7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N
7.1	General	Not connect to cable distribution system	N
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N

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Clause	Requirement – Test	Result - Remark	Verdict

7.3	Protection of equipment users from overvoltages on the cable distribution system		N
7.4	Insulation between primary circuits and cable distribution systems		N
7.4.1	General		N
7.4.2	Voltage surge test		N
7.4.3	Impulse test		N

A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		N
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N
A.1.1	Samples		--
	Wall thickness (mm)		--
A.1.2	Conditioning of samples; temperature (°C)		N
A.1.3	Mounting of samples		N
A.1.4	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D		--
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s)		--
	Sample 2 burning time (s)		--
	Sample 3 burning time (s)		--
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		P
A.2.1	Samples, material		--
	Wall thickness (mm)		--
A.2.2	Conditioning of samples; temperature (°C)		N
A.2.3	Mounting of samples		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C		--
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s)		--

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Clause	Requirement – Test	Result - Remark	Verdict

	Sample 2 burning time (s)		--
	Sample 3 burning time (s)		--
A.2.7	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	Hot flaming oil test (see 4.6.2)		N
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N
B.1	General requirements		N
	Position		--
	Manufacturer	(see appended table 1.5.1)	--
	Type	(see appended table 1.5.1)	--
	Rated values	(see appended table 1.5.1)	--
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N
	Test duration (days)		--
	Electric strength test: test voltage (V)		--
B.6	Running overload test for d.c. motors in secondary circuits		N
B.6.1	General		N
B.6.2	Test procedure		N
B.6.3	Alternative test procedure		N
B.6.4	Electric strength test; test voltage (V)		N
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1	General		N

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Clause	Requirement – Test	Result - Remark	Verdict
B.7.2	Test procedure		N
B.7.3	Alternative test procedure		N
B.7.4	Electric strength test; test voltage (V) :		N
B.8	Test for motors with capacitors	(see appended table 5.3)	N
B.9	Test for three-phase motors	(see appended table 5.3)	N
B.10	Test for series motors		N
	Operating voltage (V) :		--
C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		P
	Position :	T1	--
	Manufacturer :	(see appended table 1.5.1)	--
	Type :	(see appended table 1.5.1)	--
	Rated values :	(see appended table 1.5.1)	--
	Method of protection..... :	Inherent	--
C.1	Overload test	(see appended table 5.3)	P
C.2	Insulation	(see appended table 5.2)	P
	Protection from displacement of windings..... :	By bobbin and insulation tape	P
D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		P
D.1	Measuring instrument		P
D.2	Alternative measuring instrument		N
E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		N
F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10 and Annex G)		P
G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N
G.1	Clearances		N
G.1.1	General		N
G.1.2	Summary of the procedure for determining minimum clearances		N

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Clause	Requirement – Test	Result - Remark	Verdict
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply		N
G.2.2	Earthed d.c. mains supplies		N
G.2.3	Unearthed d.c. mains supplies		N
G.2.4	Battery operation		N
G.3	Determination of telecommunication network transient voltage (V)		N
G.4	Determination of required withstand voltage (V)		N
G.4.1	Mains transients and internal repetitive peaks		N
G.4.2	Transients from telecommunication networks		N
G.4.3	Combination of transients		N
G.4.4	Transients from cable distribution systems		N
G.5	Measurement of transient 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	Determination of minimum clearances		N
H	ANNEX H, IONIZING RADIATION (see 4.3.13)		N
J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal(s) used		--
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V)		N
K.3	Thermostat endurance test; operating voltage (V)		N
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation		N

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Clause	Requirement – Test	Result - Remark	Verdict

L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)		N
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N

M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
M.3.1.1	Frequency (Hz)		--
M.3.1.2	Voltage (V)		--
M.3.1.3	Cadence; time (s), voltage (V)		--
M.3.1.4	Single fault current (mA)		--
M.3.2	Tripping device and monitoring voltage		N
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N

N	ANNEX N, IMPULSE TEST GENERATORS (see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3 and Clause G.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N

P	ANNEX P, NORMATIVE REFERENCES		--
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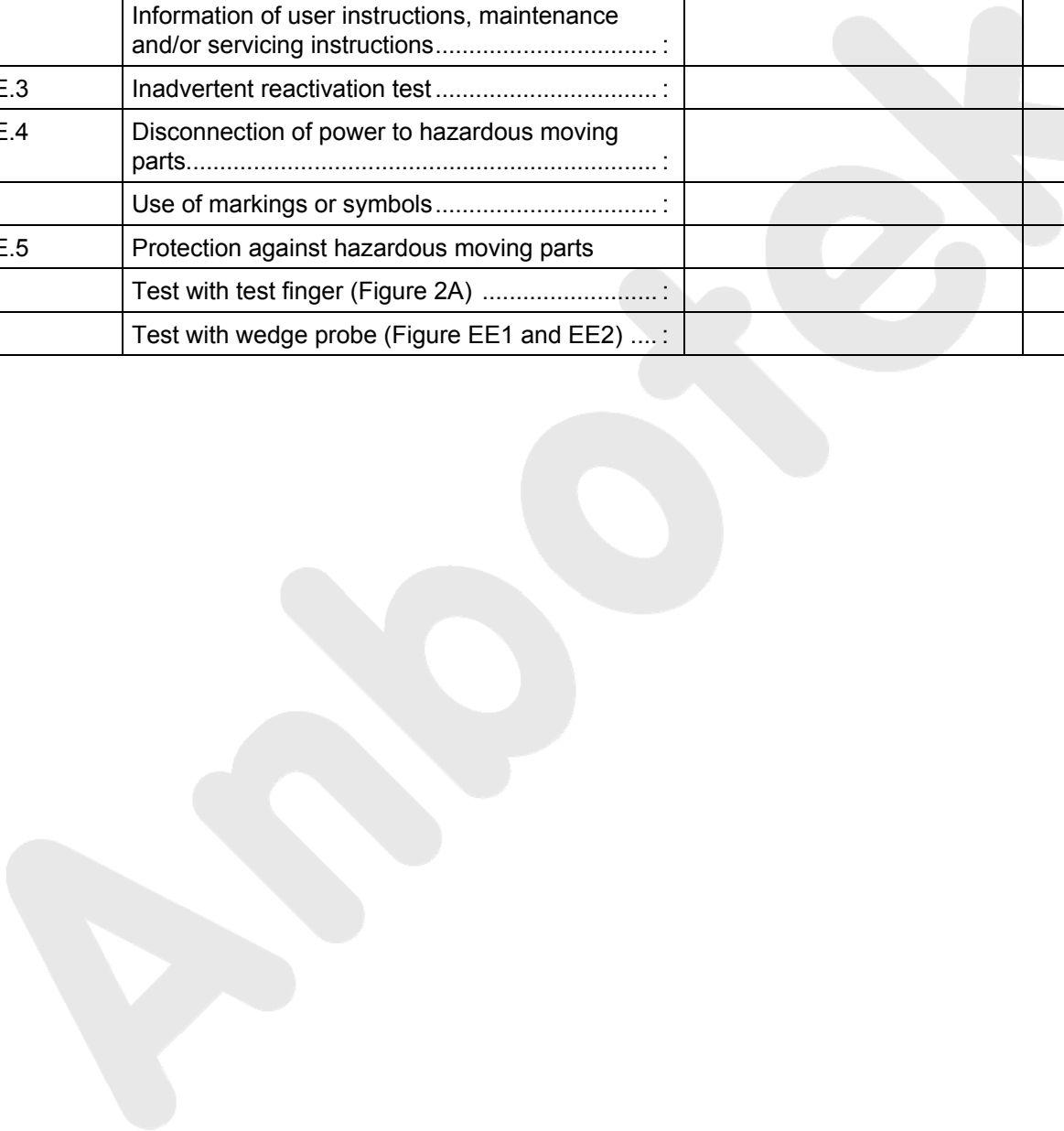
Q	ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)		P
	- Preferred climatic categories	Considered	P

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Clause	Requirement – Test	Result - Remark	Verdict
	- Maximum continuous voltage		P
	Body of the VDR Test according to IEC60695-11-5		P
	Body of the VDR. Flammability class of material (min V-1)		P
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)		N
R.2	Reduced clearances (see 2.10.3)		N
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		P
		(see appended table 1.5.1)	--
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		P
V.1	Introduction		P
V.2	TN power distribution systems		P
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		N
W.1	Touch current from electronic circuits		N
W.1.1	Floating circuits		N
W.1.2	Earthed circuits		N
W.2	Interconnection of several equipments		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N

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Clause	Requirement – Test	Result - Remark	Verdict
W.2.3	Common return, connected to protective earth		N
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)		P
X.1	Determination of maximum input current		P
X.2	Overload test procedure		P
Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		N
Y.1	Test apparatus		N
Y.2	Mounting of test samples		N
Y.3	Carbon-arc light-exposure apparatus		N
Y.4	Xenon-arc light exposure apparatus		N
Z	ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)		P
AA	ANNEX AA, MANDREL TEST (see 2.10.5.8)		N
BB	ANNEX BB, CHANGES IN THE SECOND EDITION		--
CC	ANNEX CC, Evaluation of integrated circuit (IC) current limiters		N
CC.1	General		N
CC.2	Test program 1		N
CC.3	Test program 2		N
CC.4	Test program 3		N
CC.5	Compliance		N
DD	ANNEX DD, Requirements for the mounting means of rack-mounted equipment		N
DD.1	General		N
DD.2	Mechanical strength test, variable N		N
DD.3	Mechanical strength test, 250N, including end stops		N
DD.4	Compliance		N

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Clause	Requirement – Test	Result - Remark	Verdict


EE	ANNEX EE, Household and home/office document/media shredders		N
EE.1	General		N
EE.2	Markings and instructions		N
	Use of markings or symbols		N
	Information of user instructions, maintenance and/or servicing instructions		N
EE.3	Inadvertent reactivation test		N
EE.4	Disconnection of power to hazardous moving parts.....		N
	Use of markings or symbols		N
EE.5	Protection against hazardous moving parts		N
	Test with test finger (Figure 2A)		N
	Test with wedge probe (Figure EE1 and EE2)		N



EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
(A12:2011)	Delete NOTE Z1 and the addition for Portable Sound System. Add the following clause and annex to the existing standard and amendments.		
	Zx Protection against excessive sound pressure from personal music players		--
	<p>Zx.1 General</p> <p>This sub-clause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. It also specifies requirements for earphones and headphones intended for use with personal music players.</p> <p>A personal music player is a portable equipment for personal use, that:</p> <p>is designed to allow the user to listen to recorded or broadcast sound or video; and primarily users headphones or earphones that can be worn in or on or around the ear; and allows the user to walk around while in use.</p> <p>NOTE 1 Examples are hand-held or body-worn portable CD players, MP3 audio players, mobile phones with MP3 type features, PDA's or similar equipment.</p> <p>A personal music player and earphones or headphones intended to be used with personal music players shall comply with the requirements of this sub-clause.</p> <p>The requirements in this sub-clause are valid for musci or video mode only.</p> <p>The requirements do not apply:</p> <p>while the personal music player is connected to an external amplifier; or</p> <p>while the headphone or earphones are not used.</p> <p>NOTE 2 An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to play the music as a standalone music player.</p> <p>The requirements do not apply to:</p> <p>hearing aid equipment and professional equipment;</p> <p>NOTE 3 Professional equipment is equipment sold through special sale s channels. All products sold through normal electronics stores are considered not to professional equipment.</p>		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
	analogue personal music players (personal music players without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015.		
	NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies. For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply.		N
	<p>Zx.2 Equipment requirements No safety provision is required for equipment that complies with the following: equipment provided as a package (personal music player with its listening device), where the acoustic output $L_{Aeq,T}$, is ≤ 85 dBA measured while playing the fixed “programme simulation noise” as described in EN 50332-1; and a personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” as described in EN 50332-1.</p> <p>NOTE 1 Wherever the term acoustic acoustic output is used in this clause, the 30 s A-weighted equipment sound pressure level $L_{Aeq,T}$, is meant. See also Zx.5 and Annex Zx. All other equipment shall: a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and b) have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and c) provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and NOTE 2 Examples of means include visual or audible signals. Action from the user is always required. NOTE 3 The 20 h listening time is the accumulative</p>		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
	<p>listening time, independent how often and how long the personal music player has been switched off.</p> <p>d) have a warning as specified in Zx.3; and</p> <p>e) not exceed the following:</p> <p>1) equipment provided as a package (player with its listening device), the acoustic output shall be ≤ 100 dBA measured while playing the fixed “programme simulation noise” described in EN 50332-1; and</p> <p>2) a personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” described in EN 50332-1.</p> <p>For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. In this case T becomes the duration of the song.</p> <p>NOTE 4 Classical music typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA.</p> <p>For example, if the player is set with the programme simulation noise to 85 dBA, but the average music level of the song is only 65 dBA, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dBA.</p>		
	<p>Zx.3 Warning</p> <p>The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following:</p> <p>the symbol of Figure 1 with a minimum height of 5 mm; and the following wording, or similar:</p> <p>“To prevent possible hearing damage, do not listen at high volume levels for long periods.”</p>		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
	 <p>Figure 1 – Warning label (IEC 60417-6044) Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.</p>		
	Zx.4 Requirements for listening devices (headphones and earphones)		--
	<p>Zx.4.1 Wired listening devices with analogue input With 94 dBA sound pressure output $L_{Aeq,T}$, the input voltage of the fixed “programme simulation noise” described in EN 50332-2 shall be ≥ 75 mV. This requirement is applicable in any mode where the headphones can operate (active or passive), including any available setting (for example built-in volume level control).</p> <p>NOTE The values of 94 dBA – 75 mV correspond with 85dBA – 27 mV and 100 dBA – 150 mV.</p>		N
	<p>Zx.4.2 Wired listening devices with digital input With any playing device playing the fixed “programme simulation noise” described in EN 50332-1 (and respecting the digital interface standards, where a digital interface standard exists that specifies the equivalent acoustic level), the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA. This requirement is applicable in any mode where the headphones can operate, including any available setting (for example built-in volume level control, additional sound feature like equalization, etc.).</p> <p>NOTE An example of a wired listening device with digital input is a USB headphone.</p>		N
	<p>Zx.4.3 Wireless listening devices In wireless mode: with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and respecting the wireless transmission standards, where an air interface standard exists that</p>		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
	<p>specifies the equivalent acoustic level; and with volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the abovementioned programme simulation noise, the acoustic output LAeq,T of the listening device shall be ≤ 100 dBA. NOTE An example of a wireless listening device is a Bluetooth headphone.</p>		
	<p>Zx.5 Measurement methods Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval T shall be 30 s.</p> <p>NOTE Test method for wireless equipment provided without listening device should be defined.</p>		N
2.7.1	<p>Replace the subclause as follows: Basic requirements To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c):</p> <p>a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment;</p> <p>b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;</p>		P
	<p>c) it is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.</p>		P

EN 60950-1:2006+A11:2009+A1:2010+A12:2011									
Clause	Requirement – Test	Result - Remark	Verdict						
2.7.2	This subclause has been declared 'void'.		N						
3.2.3	Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses.		N						
3.2.5.1	<p>Replace "60245 IEC 53" by "H05 RR-F"; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2".</p> <p>In Table 3B, replace the first four lines by the following:</p> <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Up to and including 6 </td> <td style="text-align: right;">0,75^{a)} </td> </tr> <tr> <td style="padding-right: 20px;">Over 6 up to and including 10 </td> <td style="text-align: right;">(0,75)^{b)} 1,0 </td> </tr> <tr> <td style="padding-right: 20px;">Over 10 up to and including 16 </td> <td style="text-align: right;">(1,0)^{c)} 1,5 </td> </tr> </table> <p>In the conditions applicable to Table 3B delete the words "in some countries" in condition^{a)}.</p> <p>In NOTE 1, applicable to Table 3B, delete the second sentence.</p>	Up to and including 6	0,75 ^{a)}	Over 6 up to and including 10	(0,75) ^{b)} 1,0	Over 10 up to and including 16	(1,0) ^{c)} 1,5		N
Up to and including 6	0,75 ^{a)}								
Over 6 up to and including 10	(0,75) ^{b)} 1,0								
Over 10 up to and including 16	(1,0) ^{c)} 1,5								
3.3.4	<p>In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following:</p> <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="padding-right: 20px;">Over 10 up to and including 16 </td> <td style="padding-right: 20px;">1,5 to 2,5 </td> <td style="padding-right: 20px;">1,5 to 4</td> </tr> </table> <p>Delete the fifth line: conductor sizes for 13 to 16 A</p>	Over 10 up to and including 16	1,5 to 2,5	1,5 to 4		N			
Over 10 up to and including 16	1,5 to 2,5	1,5 to 4							
4.3.13.6 (A1:2010)	<p>Replace the existing NOTE by the following:</p> <p>NOTE Z1 Attention is drawn to:</p> <p>1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz, and</p> <p>2006/25/EC: Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation).</p>		N						
	Standards taking into account mentioned Recommendation and Directive which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.		N						
Annex H	<p>Replace the last paragraph of this annex by:</p> <p>At any point 10 cm from the surface of the OPERATOR ACCESS AREA, the dose rate shall not exceed 1 µSv/h (0,1 mR/h) (see NOTE). Account is taken of the background level.</p> <p>Replace the notes as follows:</p> <p>NOTE These values appear in Directive</p>		N						

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
	96/29/Euratom. Delete NOTE 2.		
Bibliography	Additional EN standards.		—

ZA	NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		—
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ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
1.2.4.1	In Denmark , certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets.		N
1.2.13.14	In Norway and Sweden , for requirements see 1.7.2.1 and 7.3 of this annex.		N
1.5.7.1	In Finland, Norway and Sweden , resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2.		N
1.5.8	In Norway , due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N
1.5.9.4	In Finland, Norway and Sweden , the third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex.		N
1.7.2.1	In Finland, Norway and Sweden , CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Finland : "Laitte on liitettävä suojakoskettimilla varustettuun pistorasiaan" In Norway : "Apparatet må tilkoples jordet stikkontakt" In Sweden : "Apparaten skall anslutas till jordat		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
1.7.2.1 (A11:2009)	<p>uttag”</p> <p>In Norway and Sweden, the screen of the cable distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation need to be isolated from the screen of a cable distribution system.</p> <p>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by e.g. a retailer.</p> <p>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:</p> <p>“Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).”</p>		

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
	<p>NOTE In Norway, due to regulation for installations of cable distribution systems, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.</p> <p>Translation to Norwegian (the Swedish text will also be accepted in Norway):</p> <p>“Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkøpnet utstyr – og er tilkøpnet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkøpning av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.”</p> <p>Translation to Swedish:</p> <p>”Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”</p>		N
1.7.2.1 (A2:2013)	<p>In Denmark, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet.</p> <p>The marking text in Denmark shall be as follows: In Denmark: “Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.”</p>		N
1.7.5	<p>In Denmark, socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment. For STATIONARY EQUIPMENT the socket-outlet shall be in accordance with Standard Sheet DK 1-1b or DK 1-5a.</p> <p>For CLASS II EQUIPMENT the socket outlet shall be in accordance with Standard Sheet DKA 1-4a.</p>		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
1.7.5 (A2:2013)	<p>In Denmark, socket-outlets for providing power to other equipment shall be in accordance with the DS 60884-2-D1:2011.</p> <p>For class I equipment the following Standard Sheets are applicable: DK 1-3a, DK 1-1c, DK 1-1d, DK 1-5a or DK 1-7a, with the exception for STATIONARY EQUIPMENT where the socket-outlets shall be in accordance with Standard Sheet DK 1-1b, DK 1-1c, DK 1-1d or DK 1-5a.</p> <p>Socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance with DS 60884-2-D1 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with by DS 60884-2-D1 Standard Sheet DKA 1-3a or DKA 1-3b.</p> <p>Justification the Heavy Current Regulations, 6c</p>		N
2.2.4	In Norway , for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.		N
2.3.2	In Finland, Norway and Sweden there are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex.		N
2.3.4	In Norway , for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.		N
2.6.3.3	In the United Kingdom , the current rating of the circuit shall be taken as 13 A, not 16 A.		P
2.7.1	In the United Kingdom , to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN EQUIPMENT, tests according to 5.3 shall be conducted, using an external protective device rated 30 A or 32 A. If these tests fail, suitable protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT, so that the requirements of 5.3 are met.		N
2.10.5.13	In Finland, Norway and Sweden , there are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex.		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
3.2.1.1 (A2:2013)	<p>In Denmark, supply cords of single-phase equipment having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p> <p>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.</p> <p>Justification the Heavy Current Regulations, 6c</p>		N
3.2.1.1	<p>In Spain, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994.</p> <p>Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993.</p> <p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994.</p> <p>If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.</p>		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
3.2.1.1	In the United Kingdom , apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations. NOTE 'Standard plug' is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		N
3.2.1.1	In Ireland , apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug, shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 - National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997.		N
3.2.4	In Switzerland , for requirements see 3.2.1.1 of this annex.		N
3.2.5.1	In the United Kingdom , a power supply cord with conductor of 1,25 mm ² is allowed for equipment with a rated current over 10 A and up to and including 13 A.		N
3.3.4	In the United Kingdom , the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is: • 1,25 mm ² to 1,5 mm ² nominal cross-sectional area.		N
4.3.6	In the United Kingdom , the torque test is performed using a socket outlet complying with BS 1363 part 1:1995, including Amendment 1:1997 and Amendment 2:2003 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
4.3.6	In Ireland , DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 - National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.		N
5.1.7.1	In Finland, Norway and Sweden TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment: <ul style="list-style-type: none"> • STATIONARY PLUGGABLE EQUIPMENT TYPE A that is intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, for example, in a telecommunication centre; and has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and is provided with instructions for the installation of that conductor by a SERVICE PERSON; • STATIONARY PLUGGABLE EQUIPMENT TYPE B; • STATIONARY PERMANENTLY CONNECTED EQUIPMENT. 		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
6.1.2.1 (A1:2010)	<p>In Finland, Norway and Sweden, add the following text between the first and second paragraph of the compliance clause:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none"> - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. <p>Alternatively for components, there is no distance through insulation requirements for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition</p> <ul style="list-style-type: none"> - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and - is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. 		N
	<p>It is permitted to bridge this insulation with an optocoupler complying with 2.10.5.4 b).</p> <p>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.</p> <p>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"> - the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950-1:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 60384-14; - the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14. 		N

EN 60950-1:2006+A11:2009+A1:2010+A12:2011			
Clause	Requirement – Test	Result - Remark	Verdict
6.1.2.2	In Finland, Norway and Sweden , the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON.		N
7.2	In Finland, Norway and Sweden , for requirements see 6.1.2.1 and 6.1.2.2 of this annex. The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.		N
7.3 (A11:2009)	In Norway and Sweden , for requirements see 1.2.13.14 and 1.7.2.1 of this annex.		N

Attachment No. 1

Annex ZD (informative)

IEC and CENELEC code designations for flexible cords

Type of flexible cord	Code designations	
	IEC	CENELEC
PVC insulated cords		
Flat twin tinsel cord	60227 IEC 41	H03VH-Y
Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
Ordinary polyvinyl chloride sheathed flexible cord	60277 IEC 53	H05VV-F H05VVH2-F
Rubber insulated cords		
Braided cord	60245 IEC 51	H03RT-F
Ordinary tough rubber sheathed flexible cord	60245 IEC 53	H05RR-F
Ordinary polychloroprene sheathed flexible cord	60245 IEC 57	H05RN-F
Heavy polychloroprene sheathed flexible cord	60245 IEC 66	H07RN-F
Cords having high flexibility		
Rubber insulated and sheathed cord	60245 IEC 86	H03RR-H
Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87	H03RV4-H
Crosslinked PVC insulated and sheathed cord	60245 IEC 88	H03V4V4-H

Note: Before placing the products in the different countries, the manufacturer must ensure that:

1. Operating Instructions, Ratings Labels and Warnings Labels written in an Accepted or Official Language of the county in question.
2. The equipment complies with the National Standards and/or Electrical Codes of the country in question.

Tables

1.5.1	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition/ year)	Mark(s) of conformity ¹⁾
Fuse (F1)	Littelfuse Inc	215 Series	T15A, 250V	IEC 60127-1 IEC 60127-2 UL 248	UL E10480
AC Connector(J1)	MOLEX INCORPORATED	5566 series	9A,600V, 105 degree C	UL 1977	UL E29179
(Alternate)	CVILUX CORP	CP-01 series	8A,600V, 105 degree C	UL 1977	UL E159616
(Alternate)	ASCEND PERFORMANCE MATERIALS L L C	21SPC(a)(f2)	V-2 or better, 75 degree C	UL 1059	UL
X2-capacitor (CX1)	Shenzhen Jing Yu Electronics Co., Ltd	CBBX2	1uF, 275Vac, 40/100/21	IEC 60384-14 UL 1414	VDE 40006514 UL E186662
(Alternate)	Xiamen Faratronic Co Ltd	MKP62	1uF, 275Vac , 40/110/56	IEC 60384-14 UL 1414	VDE 40000358 UL E186600
Varistor (RV1)	Epcos (Zhuhai Ftz) Co Ltd	S20K385 Q20K385	385Vac, 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2 UL 1449	VDE 40027582 UL E321126
(Alternate)	Lien Shun Electronics Co., Ltd	20D621K	385V, 40/85/56	IEC 61051-1 IEC 61051-2 IEC 61051-2-2 UL 1449	VDE 40005858 UL E327997
Y2-capacitor (CY1)	Success Electronics Co Ltd	SF、SE、SB	2200pF, 250Vac, 30/085/56	IEC 60384-14 UL 1414	VDE 128808 VDE 122995 VDE 128832 UL E114280
Y1-capacitor (CY2)	SUCCESS ELECTRONICS CO LTD	SE、SF、SB	2200pF, 250Vac, 30/125/56	IEC/EN 60384-14 UL 1414	VDE 40019457 VDE 128833 UL E114280
(Alternate)	SHANTOU HIGH-NEW TECHNOLOGY DEVELOPMENT ZONE SONGTIAN ENTERPRISE CO LTD	CD-Series	2200pF,400Vac, 25/125/21	IEC/EN 60384-14 UL 1414	VDE 40025754 UL E208107

Tables

1.5.1	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition/ year)	Mark(s) of conformity ¹⁾
Optical Isolators (U1)	EVERLIGHT ELECTRONICS CO., LTD.	EL817	Provide 5000 Vac isolation, rated 110 degree C. Double protection	FPQU2	UL E214129 VDE132249
(Alternate)	SHARP CORP ELECTRONIC COMPONENTS AND DEVICES GROUP	PC817 Series	Provide 5000 Vac isolation, rated 100 degree C. Double protection	FPQU2	UL E64380 VDE4000808 7
Diode bridge (BR1)	SHINDENGEN ELECTRIC MFG CO LTD	<u>US8KB80R</u>	800V, 8A	UL 1557	UL E142422
(Alternate)	Various	Various	Min 800V, 8A	UL 1557	UL
Electrolytic capacitor (E1)	Various	Various	Min. 450V, 220uF, 105°C	IEC 60950-1	Tested with appliance
Mosfet (Q8)	Various	Various	Min. 650V, 20.7A	IEC 60950-1	Tested with appliance
Bleeding Resistors (R1、 R2、 R3)	Various	Various	510K Ohm, 1/4W	IEC 60950-1	Tested with appliance
Heating shrink tube	Changyuan Electronics (Shenzhen) Co., Ltd	CB-HFT	600V, 125°C, VW-1	UL 224	UL E180908
(Alternate)	Shenzhen Woer Heat-Shrinkable Material Co., Ltd	RSFR-H	600V, 125°C, VW-1	UL 224	UL E203950
Insulation sheet	DUPONT HONGJI FILMS FOSHAN CO LTD	ELD、 EM001、 EM	VTM-2, 105°C	UL 94	UL E241830
(Alternate)	GARWARE POLYESTER LTD	ERE、 ER、 EM6	VTM-2, 105°C	UL 94	UL E110983
Silicon sheet	UNI-HOME INDUSTRY CORP	SB-HC	V-0, 150°C	UL 94	UL E143853
(Alternate)	Zhuhai Lixing Compound Material Co Ltd	LX3570	V-0, 150°C	UL 94	UL E302710

Tables

1.5.1	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition/ year)	Mark(s) of conformity ¹⁾
(Alternate)	Shenzhen Nuode Site Technology Co Ltd	NDST-SP-001; NDST-SB-110	V-0, 150°C	UL 94	UL E338508
PCB	SHENZHEN HONGMY PRECISION CIRCUIT CO LTD	HMY-D	V-0, 130 °C	UL 94	UL E320045
(Alternate)	Various	Various	V-0, 130°C	UL 796	UL
Inductor (L1, L2)	Shenzhen Gold power Tech Co., Ltd.	L0984	130°C	IEC 60950-1	Tested with appliance
Transformer (T1)	SICHUAN CHANGHONG ELECTRIC CO LTD	T1692	Class B	IEC/EN 60950-1	Test with appliance
-Bobbin	Sumitomo Bakelite	PM-9820, PM-9630	V-0, 150°C	UL 94	UL E41429
(Alternate)	Chang Chun Plastics Co Ltd	T375J, T375HF	V-0, 150°C	UL 94	UL E59481
-Triple insulation wire	Great Leoflon Industrial Co Ltd	TRW(B), TRW(F)	Class B	EN 60950-1 UL 2353	UL, VDE
(Alternate)	Furukawa Electric Co Ltd	TEX-E, TEX-EA, TEX-BS TEX-B	Class B	EN 60950-1 UL 2353	VDE, UL
(Alternate)	COSMOLINK CO LTD	TIW-M	Class B	EN 60950-1 UL 2353	VDE, UL E213764
-Insulation tape	Jingjiang Yahua Pressure Sensitive Glue Co Ltd	CT, PZ	130°C	UL 510	UL E165111
(Alternate)	Jingjiang Yahua Pressure Sensitive Glue Co Ltd	PF	180	UL 510	UL E165111

¹⁾ An asterisk indicates a mark which assures the agreed level of surveillance.

Test Tables

1.6.2	TABLE: electrical data test (in normal conditions)						P
fuse #	I rated (A)	U (V)	P (W)	I (A)	Ifuse (A)	condition	
F1	--	90V, 50Hz	459.7	5.102	5.102	Loading: DC5V, 50A	
F1	5	100V, 50Hz	455.1	4.540	4.540	Loading: DC5V, 50A	
F1	5	240V, 50Hz	435.1	1.846	1.846	Loading: DC5V, 50A	
F1	--	264V, 50Hz	433.2	1.632	1.632	Loading: DC5V, 50A	
F1	--	90V, 60Hz	462.4	5.134	5.134	Loading: DC5V, 50A	
F1	5	100V, 60Hz	457.6	4.572	4.572	Loading: DC5V, 50A	
F1	5	240V, 60Hz	436.4	1.851	1.851	Loading: DC5V, 50A	
F1	--	264V, 60Hz	434.3	1.635	1.635	Loading: DC5V, 50A	

2.1.1.5 c) 1)	TABLE: max. V, A, VA test				N
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)	
--	--	---	---	--	
Remark:					

2.1.1.5 c) 2)	TABLE: stored energy		N
Capacitance C (μF)	Voltage U (V)	Energy E (J)	
--	--	--	
Remark:			

2.2	TABLE: evaluation of voltage limiting components in SELV circuits				P
Location		Voltage measurement (V)		Comments	
Component (measured between)		max. voltage (V) (normal operation)		Voltage Limiting Components	
Transformer	Location	V peak	V d.c.		
T1	Pin(7,8)-Pin(11,12)	48.0	--		
After D14		--	6.4		
Remark: Input: 264V, 60Hz.					

Test Tables

2.5	TABLE: limited power source measurement				N
Condition	Output voltage (Uoc) (V)	Output current (Isc) (A)		Apparent power (S) (VA)	
Normal condition	--	--		--	
Single fault	I _{sc} (A)		VA		
	Meas.	Limit	Meas.	Limit	
--	--	--	--	--	--
Remark: SC=Short circuit, OC=Open circuit					

2.10.2	TABLE: Working voltage measurement					P
Component	From	To	V peak	V rms	Remark	
T1	Pin(2,3)	Pin (7,8)	420	223	Max. Vpeak and Vrms	
		Pin (9,10)	484	250		
		Pin (11,12)	390	204		
	PE	420	225			
	Pin(4,5)	Pin (7,8)	260	149		
Pin (9,10)		264	152			
Pin (11,12)		300	155			
PE		260	149			
U1	Pin1	Pin3	384	190	Max. Vpeak and Vrms	
		Pin4	384	189		
	Pin2	Pin3	372	181		
		Pin4	378	181		
CY2	Primary	Secondary	388	292		
Remark:						

2.10.3 and 2.10.4	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)	
Functional:							
L to N	339	240	1.5	5.1	2.4	5.7	
Basic/supplementary							
L to PE	339	240	2.0	3.6	2.4	3.6	

Test Tables

N to PE	339	240	2.0	>10.0	2.4	>10.0
Across F1	339	240	2.0	2.5	2.4	2.5
Across CY1	339	240	2.0	3.0	2.4	3.0
Across CY2	339	240	2.3	4.2	2.4	4.2
F1 trace to PE	339	240	2.0	4.2	2.4	4.2
T1 Pri. winding to core	339	240	2.0	5.4	2.4	5.4
T1 Sec. winding to core	484	250	2.4	3.1	2.4	3.1
T1 pri./sec. Pin to core	484	250	2.4	3.1	2.5	3.1
Reinforced/Double						
T1 pri. Pin to sec. Pin	484	250	4.0	32.0	5.8	32.0
Supplementary information: Clearance distance was evaluated for operating altitude up to 3000m above sea level and correction factor 1.14 was used.						

2.10.5	TABLE: Distance through insulation measurements					P
distance through insulation di at/of:	U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)	
optocoupler	384	190	3000	≥0.4	Min. 0.4	
Transformer T1 bobbin	484	250	3000	≥0.4	0.8	
Remark:						

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

Test Tables

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

4.5	TABLE: Thermal requirements					P	
	Supply voltage (V)	90V 60Hz	264V 60Hz			—	
	Ambient T _{min} (°C)	50° C				—	
	Ambient T _{max} (°C)	50° C				—	
Maximum measured temperature T of part/at::		T (°C)				Allowed T _{max} (°C)	
AC Inlet		56.0	51.2			70.0	
AC Inlet wire		58.3	54.6			105.0	
CY1 body		68.9	66.9			85.0	
RV1 body		71.3	69.3			85.0	
X-CAP. CX1		71.7	71.0			100.0	
L1 Winding		96.1	95.6			130.0	
L2 Winding		99.7	96.8			130.0	
PCB near BR1		95.1	93.8			130.0	
Capacitor E1 body		90.0	88.3			105.0	
Heatsink of D14		78.6	77.3			130.0	
T1Winding		106.4	105.1			110.0	
T1 core		86.0	84.2			110.0	
CY2 body		79.3	77.9			125	
Optocoupler U1		94.6	93.8			100.0	
Capacitor E2 body		89.1	87.2			105.0	
Enclosure outside above T1		55.8	54.9			Ref.	
Enclosure outside under T1		69.6	68.2			Ref.	
Ambient		--	--			50.0	
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

Test Tables

--	--	--	--	--	--	--	--
Supplementary information:							

4.5.5	TABLE: Ball pressure test of thermoplastics				P
	required impression diameter (mm)	≤ 2 mm		---	
part		test temperature (°C)	impression diameter (mm)		
Transformer T1 bobbin		125	1.2		
Remark:					

4.7	TABLE: Resistance to fire					P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence	
PCB	SHENZHEN HONGMY PRECISION CIRCUIT CO LTD	HMY-D	1.6	V-0	UL	
Supplementary information:						

5.1.6	TABLE: Touch current measurement				P
Condition	L → terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments	
L/N and PE	1.05	1.12	3.5	To enclosure	
L/N and output terminal	0.136	0.136	0.25	To output terminal	
Supplementary information:					

5.2	TABLE: Electric strength tests, impulse tests and voltage surge tests			P
Test voltage applied between:		Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No
L/N to PE		AC	1500	No
Primary circuit to enclosure		AC	1500	No
Transformer T1, primary winding to secondary winding		AC	3000	No
Transformer T1, secondary winding to core		AC	1500	No
Heat-shrinkable tube (for each type)		AC	1500	No

Test Tables

Two layers of Insulation tape (for each type)	AC	3000	No
L/N to output terminal	AC	3000	No
Supplementary information:			

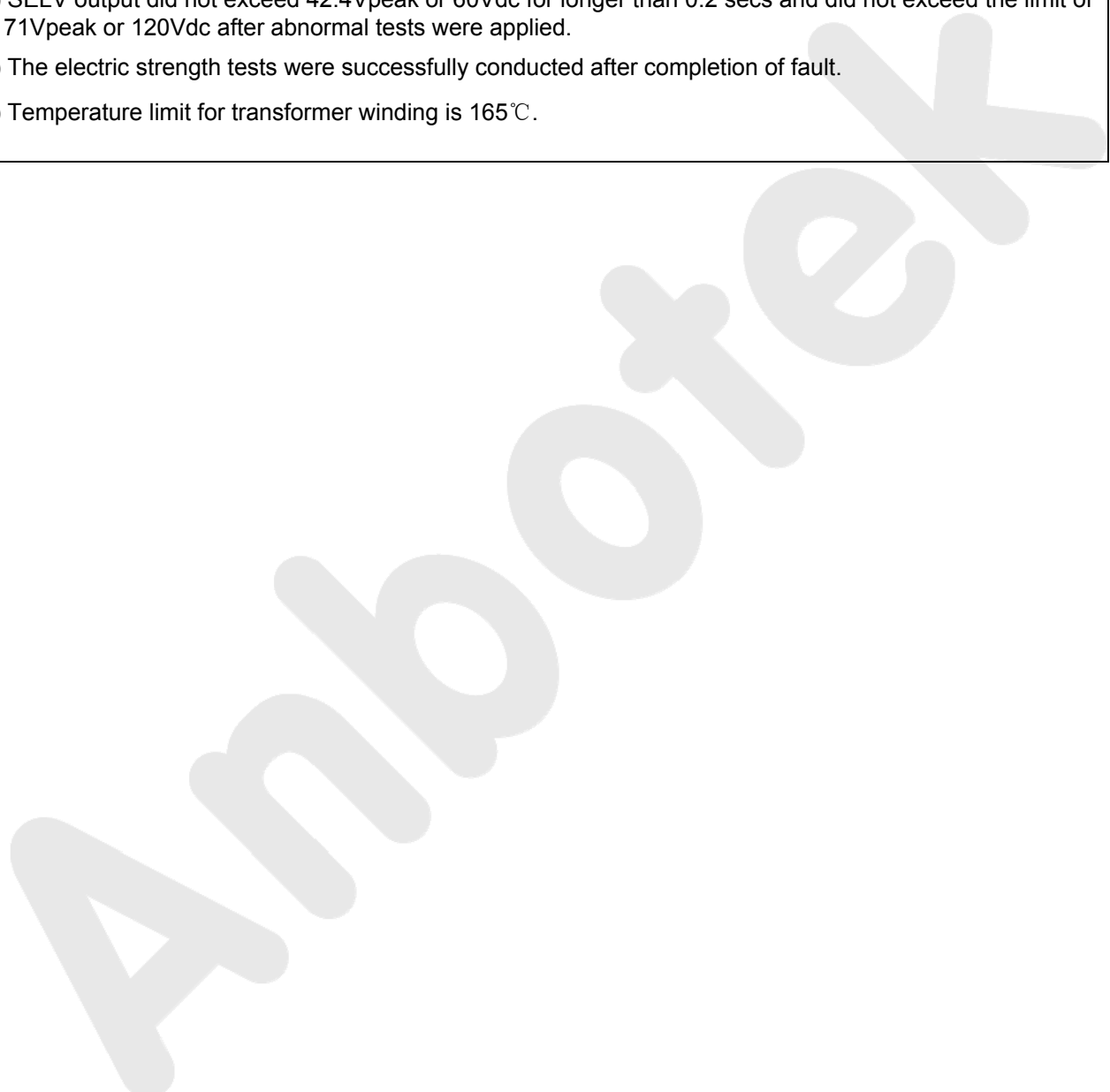
5.3.5		TABLE: Fault condition tests					P
		ambient temperature (°C)			25° C		--
		model/type of power supply			--		--
		manufacturer of power supply			--		--
		rated markings of power supply			See rating label		--
No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
1	Output	O/L DC5V, 50A	240	9h	F1	4.912 - 4.926- 4.938- 4.961 - 0.052	Max. output loading current is 51.5A and max. temperature was obtained under it. After 51.5A, unit shutdown immediately, D14 damaged. No hazards. T1: 155.2°C
2	Output	SC	240	30min	F1	0.052	After SC, unit shut down immediately and recoverable after the fault condition removed. No damaged, no hazards.
3	Opening	Ventilation block	240	4h	F1	0.052	Unit operated under the fault condition, test cycling and ran for thermal equilibrium under it. No damaged, no hazard.
4	RV 1	SC	240	<1s	F1	>31.5	After SC, F1 opened immediately. No hazards.
5	E1	S/C	240	<1s	F1	>31.5	After SC, fuse F1 opened immediately . No hazard.
6	T2 Pin(2,3)-pin (4,5)	SC	240	30min	F1	0.522	After SC, unit shut down immediately and recoverable after the fault condition removed. No damaged, no hazard.
7	T2 Pin (7,8)-pin (11,12)	SC	240	30min	F1	0.522	After SC, unit shut down immediately and recoverable after the fault condition removed. No damaged, no hazard.
8	Optocoupler U1 Pin1 – Pin 2	SC	240	30min	F1	0.522	After SC, unit shut down immediately and recoverable after the fault condition removed. No damaged, no hazard.

Test Tables

9	Optocoupler U1 Pin3 – Pin4	SC	240	30min	F1	0.522	After SC, unit shut down immediately and recoverable after the fault condition removed. No damaged, no hazard.
10	D14	SC	240	10min	F1	>31.5	After SC, unit shut down immediately. F1 opened. No hazard.

Remark:

- 1) SELV output did not exceed 42.4Vpeak or 60Vdc for longer than 0.2 secs and did not exceed the limit of 71Vpeak or 120Vdc after abnormal tests were applied.
- 2) The electric strength tests were successfully conducted after completion of fault.
- 3) Temperature limit for transformer winding is 165°C.



Photos



Photos

