

TEST REPORT

IEC 60950

Safety of information technology equipment

Report reference No. : E 2160602 E01

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Date of issue : March 30, 2001

Testing laboratory : TÜV Rheinland Japan Ltd., Yokohama Laboratories

Address : Festo Bldg. 5F, 1-26-10 Hayabuchi, Tsuzuki-Ku,
Yokohama 224-0025, Japan

Testing location : TÜV Rheinland Japan Ltd., Yokohama Laboratories

Applicant : Asustek Computer Inc.

Address : No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan, R.O.C.

Standard : IEC 60 950:1991+A1:1992 + A2:1993 + A3:1995 + A4:1996
EN60950:1992+A1:1993+A2:1993+A3:1995+A4:1997+A11:1997
EMKO-TSE(74-SEC)207/94, UL 1950, C22.2 No. 950 3rd edition,
AS 3260

Test Report Form No. : I950__D/97-06

TRF originator..... : FIMKO

Master TRF..... : reference No. I950 D, dated 97-02

Copyright blank test report..... : the bodies participating in the Committee of Certification Bodies (CCB)
and/or the CENELEC Certification Agreement (CCA). This report is based
on a blank test report that was prepared by KEMA using information
obtained from the TRF originator.

Test procedure : CB Scheme

Procedure deviation : Australia, Austria, Belgium, China, Canada, The Czech Republic,
Denmark, Finland, France, Germany, Greece, Hungary, India, Ireland,
Israel, Italy, Japan, Rep. of Korea, The Netherlands, Norway, Poland,
Russia Fed., Slovenia, Slovakia, South Africa, Spain, Sweden,
Switzerland, United Kingdom, USA

Non-standard test method : N.A.

This report is not valid as a CB Test Report unless appended to a CB Test Certificate issued
by a NCB, in accordance with IEC 60950-2

Type of test object : Personal Computer

Trademark : ASUS®

Model/type reference : T1000-120S, T1000-149PH, C300-CSTXX, E500-CSTXX
(X=0-9, A-Z or blank)

Manufacturer : Same as applicant


Factory : 1. **Maintek Computer (Suzhou) Co., Ltd.**
No. 233, Jin Feng Road, Su Zhou District, Jiang Su Province, P.R.China
2. **ASUSTek Computer Inc.**
No. 5, Shing Yeh Street, Kwei Shan Hsiang, Taoyuan Hsien, Taiwan, R.O.C.




Rating : AC 100-120/200-240V, 50-60Hz, 3/1.5A

Test item particulars:	
Equipment mobility	Movable
Operating condition.....	Continuous
Tested for IT power systems.....	Yes
IT testing, phase-phase voltage (V)	IT, 230V for Norway
Class of equipment	Class I
Mass of equipment (kg)	12.5kg
Protection against ingress of water	IPX0
Possible test case verdicts:	
- test case does not apply to the test object	N (.A.)
- test object does meet the requirement	P (ass)
- test object does not meet the requirement	F (ail)
General remarks:	
"(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.	
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 testing laboratory.	
<u>Comments:</u>	
<i>Brief description of the test sample:</i>	
<p>The model T1000-120S is a desk top type personal computer for general office use. The model T1000-149PH, C300-CSTXX and E500-CSTXX are identical to model T1000-120S except for model name for marketing purpose. In the model name, "X" could be 0-9, A-Z or blank.</p> <p>The internal building-in switching power supplies are CB Scheme tested and evaluated according to Standard IEC 60950:1991 + A1 + A2 + A3 + A4. Details of the power supply, see appended table 1.5.1.</p> <p>The test samples were pre-production sample without serial numbers. All tests were performed on model T1000-120S to represent the both similar model.</p>	


Copy of the marking plate :

ASUS[®] 華碩電腦
Model No. : T1000-120S
AC INPUT : 100-120VAC/200-240VAC
3/1.5A, 50-60Hz
CONNECT ONLY TO GROUNDED OUTLET. SEE
INSTALLATION INSTALLTION INNSTRUCTIONS
BEFORE CONNECTING TO THE SUPPLY.












US LISTED
E187242
6024
Tested to comply with
FCC standards
FOR HOME OR OFFICE USE




MADE IN TAIWAN F2

ASUS[®] 華碩電腦
Model No. : T1000-149PH
AC INPUT : 100-120VAC/200-240VAC
3/1.5A, 50-60Hz
CONNECT ONLY TO GROUNDED OUTLET. SEE
INSTALLATION INSTALLTION INNSTRUCTIONS
BEFORE CONNECTING TO THE SUPPLY.






US LISTED
E187242
6024
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FCC standards
FOR HOME OR OFFICE USE




MADE IN TAIWAN F2

Copy of the marking plate :






ASUS[®] 華碩電腦
Model No. : C300-CST1
AC INPUT : 100-120VAC/200-240VAC
3/1.5A, 50-60Hz
CONNECT ONLY TO GROUNDED OUTLET. SEE
INSTALLATION INSTALLTION INNSTRUCTIONS
BEFORE CONNECTING TO THE SUPPLY.







 Tested to comply with
 FCC standards
FOR HOME OR OFFICE USE



MADE IN TAIWAN F2

ASUS[®] 華碩電腦
Model No. : E500-CSTXX
AC INPUT : 100-120VAC/200-240VAC
3/1.5A, 50-60Hz
CONNECT ONLY TO GROUNDED OUTLET. SEE
INSTALLATION INSTALLTION INNSTRUCTIONS
BEFORE CONNECTING TO THE SUPPLY.






 Tested to comply with
 FCC standards
FOR HOME OR OFFICE USE



MADE IN TAIWAN F2

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

1	GENERAL		P
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1.5	Components		P
1.5.1	Comply with IEC 60950 or relevant component standard	Components which were found to affect safety aspects comply with the requirements of this standard or within the safety aspects of the relevant IEC component standards. (see appended tables)	P
1.5.2	Evaluation and testing components	Components which are certified to IEC and /or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
	Dimensions (mm) of mains plug for direct plug-in	The equipment is not plug-in type	N
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N)		N
1.5.3	Transformers	Transformer used are suitable for their intended application and comply with the relevant requirements of the standard and particularly Annex C.	P
1.5.4	High voltage components (component; manufacturer; flammability)	No high voltage components used.	N
1.5.5	Interconnecting cables	Interconnection cable for signal output to other devices and signal input from accessories are carrying only SELV voltages on an energy level below 240VA. → Except for the insulation material, there are no further requirements to the interconnection cable.	P
1.5.6	Mains Capacitors	In approved SPS.	N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

1.6	Power interface		P
1.6.1	Steady state input current	Highest load according to 1.2.2.1 for this equipment is the FDD, HDD and CD-ROM permanently access. Two dummy loads of 2.5W in connection to represent the USB load. Two dummy load of 5Vdc/10W to represent each slots on mainboard. The operator can connect additional options like a parallel printer or a serial device. The output power of max. 0.5W is considered to be negligible. (see appended table)	P
	Current deviation during normal operating cycle	< + 10%	P
1.6.2	Voltage limit of hand-held equipment	This appliance is not a hand-held equipment.	N
1.6.3	Neutral conductor insulated from earth and body	The neutral is not identified in the equipment. Basic insulation for rated voltage between earthed parts and primary phases.	P
1.6.4	Components in equipment intended for IT power system	Phase to earth designed in according to phase-to-phase working voltage. The Y2 type capacitor used between phase-to-earth.	P
1.6.5	Mains supply tolerance (V)	+ 6%, -10% Documentation specifies a rating of AC 100-120/200-240V at 50-60Hz. Relevant tests were done with the range of AC 90-127/180-254V at 50-60Hz.	P

1.7	Marking and instructions		P
1.7.1	Rated voltage (V)	100-120VAC/200-240VAC	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
	Symbol of nature of supply for d.c.:	Mains from AC source	N
	Rated frequency (Hz)	50-60Hz	P
	Rated current (A)	3/1.5A	P
	Manufacturer	Not shown.	N
	Trademark	ASUS®	P
	Type/model	T1000-120S, T1000-149PH, C300-CSTXX, E500-CSTXX (X=0-9, A-Z or blank)	P
	Symbol of Class II	Class I equipment	N
	Certification marks	UL, CUL, N	N
1.7.2	Safety instructions	The users manual contains information for operation, installation, servicing, transport, storage and technical data. Marking for laser class 1 type CD-ROM Drivers, the wording in user's manual: Class 1 Laser Product Laser Klasse 1	P
1.7.3	Short duty cycles	Equipment is designed for continuous operation.	N
1.7.4	Marking for voltage setting/frequency setting ...:	The voltage range need to be adjusted by a selector switch. The adjusted voltage is visible on the switch. No instruction is required on the equipment.	P
1.7.5	Marking at power outlets	No outlet.	N
1.7.6	Marking at fuseholders	In approved SPS.	N
1.7.7.1	Protective earthing terminals	Appliance inlet used.	N
1.7.7.2	Terminal for external primary power supply conductors	The equipment with appliance inlet is intended to be used with the detachable type power supply cord.	N
1.7.8.1	Identification and location of switches and controls	The marking and indication of the front panel switch is located that indication of function is clearly.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
1.7.8.2	Colours of controls and indicators	The colours used for LED are indicating the following function: - green (power ON) - green or yellow (function of FDD or CD-ROM) - green (HDD data processing) As orange is reserved according to IEC 60073 for caution function, the orange LEDs are not complied. However, this LED is not involved with safety, therefore, it is acceptable.	P
1.7.8.3	Symbols according to IEC 60417	Marking for front panel switch with symbol according to IEC 60417, No. 5009-a (line half inside circle).	P
1.7.8.4	Figures used for marking	No indicators for different positions.	N
1.7.8.5	Location of markings and indications for switches and controls	The marking for the switch is located on the switch button.	P
1.7.9	Isolation of multiple power sources	Only one supply from the mains.	N
1.7.10	Instructions for installation to IT power system	The instructions will be provided when national approval.	N
1.7.11	Instructions when protection relies on building installation	Connected to the mains by pluggable type A.	N
1.7.12	Marking when leakage current exceeds 3.5 mA	Leakage current does not exceed 3.5mA.	N
1.7.13	Indication at thermostats and regulating devices	No adjustable thermostats.	N
1.7.14	Language of safety markings/instructions	User's manual and Instruction related to safety provided in English. Marking in English. Version in other languages will be provided when national approval.	P
	Language	English	—

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
1.7.15	Durability and legibility	<p>The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15 sec. and then again for 15 sec. with the cloth soaked with petroleum spirit.</p> <p>After this test there was no damage to the label. The marking on the label did not fade. There was no curling or lifting of the label edge.</p>	P
1.7.16	Removable parts	No marking placed on removable part.	P
1.7.17	Warning text for replaceable lithium batteries	RTC battery cell (CR2032) is user exchangeable. Warning sentence printed in user's and service personnel's manual.	P
	Language	English. Versions in other languages will be provided when national approval.	—
1.7.18	Operator access with a tool	<p>The inside of the personal computer is regarded to be operator access area. This area is accessible when enclosure of personal computer is be disassembled with a screwdriver.</p> <p>When the enclosure is disassembled, the earthed metal enclosure of SPS is accessible.</p> <p>However, the SPS enclosure can be opened with the same screwdriver as the screw head is in same construction. Therefore, the SPS provided with electric shock hazard symbol (ISO 3864, No. 5036) on its rating label to discourage the user to access.</p>	P
1.7.19	Equipment for restricted access locations	No restricted access location.	N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

2	PROTECTION FROM HAZARDS		P
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2.1	Protection against electric shock and energy hazards		P
2.1.1	Access to energized parts	See below	P
2.1.2	Protection in operator access areas	As the user's manual specifies directions for the operator how to add additional memory cards or add-on cards inside the enclosure, the inside of this personal computer is regarded to be operator access area. With the disassembled personal computer enclosure, the accessible SPS is covered with an earthed metal enclosure. The construction of this metal enclosure prevents the accessibility to any parts with only basic insulation to ELV or hazardous voltage with test pin or test finger.	P
	Test by inspection	dto	P
	Test with test finger	dto	P
	Test with test pin	dto	P
2.1.3.1	Insulation of internal wiring in an ELV circuit accessible to operator	No ELV wiring in operator accessible area.	N
	Working voltage (V); distance (mm) through insulation		N
2.1.3.2	Operator accessible insulation of internal wiring at hazardous voltage	No hazardous voltage wiring in operator accessible area.	N
2.1.4.1	Protection in service access areas	No maintenance work in operation mode necessary.	N
2.1.4.2	Protection in restricted access locations	It is not intended to be used in restricted locations	N
2.1.5	Energy hazard in operator access area	The overall output of the SPS is below 240VA.	P
2.1.6	Clearances behind conductive enclosures	Refer to 4.2.3.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.1.7	Shafts of manual controls	None at ELV or hazardous voltage	N
2.1.8	Isolation of manual controls	None at ELV or hazardous voltage	N
2.1.9	Conductive casings of capacitors	In approved SPS.	N
2.1.10	Risk of electric shock from stored charge on capacitors connected to mains circuit		N
	Time-constant (s); measured voltage (V):		—

2.2	Insulation		P
2.2.1	Methods of insulation	The insulation materials provided in the equipment with adequate thickness and adequate creepage distance over their surface and clearance distance through air.	P
2.2.2	Properties of insulating materials	Natural rubber, asbestos or hygroscopic materials are not used	P
2.2.3	Humidity treatment	Total time elapsed: 48 hours	P
	Humidity (%):	95% R.H.	—
	Temperature (°C):	25°C	—
2.2.4	Requirements for insulation	Please refer to 5.3, 2.9 and 5.1.	P
2.2.5	Insulation parameters	Both parameters were considered.	P
2.2.6	Categories of insulation	The adequate levels of safety insulation is provided and maintained to comply with the requirements of this standard.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.2.7	Determination of Working voltage	The rms and the peak voltages were measured on the switching power supply. The unit was connected to a 240V TN power system and secondary ground was maintained during measurement. Results see appended table.	P
2.2.7.1	General rules for working voltages	Considered	P
2.2.7.2	Clearances in primary circuits	Considered	P
2.2.7.3	Clearances in secondary circuits	Considered	P
2.2.7.4	Creepage distances	Considered	P
2.2.7.5	Electric strength tests	Considered	P
2.2.8	Double or reinforced insulation bridged by components	No component bridged reinforced or double insulation.	N
2.2.8.1	Bridging capacitors		N
2.2.8.2	Bridging resistors		N
2.2.8.3	Accessible parts		N

2.3	Safety extra-low voltage (SELV) circuits		P
2.3.1	Voltage (V) of SELV circuits under normal operating conditions and after a single fault	42.4V peak or 60VDC are not exceeded in SELV circuit under normal operation or single fault condition	—
2.3.2	Voltage (V) between any two conductors of SELV circuit(s) and for Class I equipment between any conductor of SELV circuit and equipment protective earthing terminal under normal operating conditions	Between any SELV circuits 42.4V peak or 60VDC are not exceeded	P
2.3.3	Voltage (V) of SELV in the event of a single failure of basic or supplementary insulation or of a component	Single fault did not cause excessive voltage in accessible SELV circuits. Limits of 71V peak and 120V DC were not exceed and SELV limits not for longer than 0.2 seconds	—
	Method used for separation	Method 1	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.3.4	Additional constructional requirements	<p>Ring terminals for PE connection are prevented from pivoting which could impair distances to hazardous parts by starwasher.</p> <p>In multiway connectors and other cable ties prevent contact to hazardous parts in case of loosening of connection or conductor breakage.</p> <p>IEC 60083 and IEC 60320 connectors are not used in SELV.</p>	P
2.3.5	Connection of SELV circuits to other circuits	<p>See 2.3.2 and 2.3.3.</p> <p>No direct connection between SELV and any primary circuits.</p>	N

2.4	Limited current circuits		N
2.4.2	Frequency (Hz)		—
	Measured current (mA)		N
2.4.3	Measured voltage (V)		—
	Measured capacitance (μ F)		N
2.4.4	Measured voltage (V)		—
	Measured charge (μ C)		N
2.4.5	Measured voltage (V)		—
	Measured energy (mJ)		N
2.4.6	Limited current circuit supplied from or connected to other circuits		N

2.5	Provisions for earthing		P
2.5.1	Class I equipment	Basic insulated conductive parts touchable in operator area earthed reliably.	P
	Warning label for service personnel		N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.5.2	Protective earthing in Class II equipment	Class I equipment	N
2.5.3	Switches/fuses in earthing conductors	No switches or fuses in earthing conductor.	P
2.5.4	Assured earthing connection for Class I equipment in systems comprising Class I and Class II equipment	This unit has its own earthing connection. Any other units connected via the interconnecting cable to other unit shall provide SELV only. The equipment does not comprise class I and class II	P
2.5.5	Green/yellow insulation	Green/yellow wire from inlet to SPS chassis. Green/Yellow wire to SPS chassis reliable fixed with starwasher and screw.	P
2.5.6	Continuity of earth connections	It is not possible to disconnect earth without disconnecting mains as an appliance inlet is used.	P
2.5.7	Making and breaking of protective earthing connections	Plug or inlet, earthing connected before and disconnected after hazardous voltage. No other operator removable parts.	P
2.5.8	Disconnection protective earthing connections	It is not necessary to disconnect earthing except for the removing of the earthed parts itself	P
2.5.9	Protective earthing terminals for fixed supply conductors or for non-detachable power supply cords		N
2.5.10	Corrosion resistance	All safety earthing connections in compliance with Annex J.	P
2.5.11	Resistance (Ω) of protective earthing conductors $\leq 0.1 \Omega$	$\leq 0.1 \Omega$, see below.	P
	Test current (A)	(see appended table)	—
2.6	Primary power isolation		P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.6.1	General requirements	The appliance inlet is considered to be the disconnect device	P
2.6.2	Type of disconnect device	Appliance inlet	P
2.6.3	Disconnect device in permanently connected equipment	Pluggable equipment type A.	N
2.6.4	Parts of disconnect device which remain energized	When plug or inlet is disconnected no remaining parts with hazardous voltage in the equipment	P
2.6.5	Switches in flexible cords	No isolation switch provided.	N
2.6.6	Disconnection of both poles simultaneously for single-phase equipment	The plug or inlet disconnects both poles simultaneously.	P
2.6.7	Disconnection of all phase conductors of supply in three-phase equipment	Single phase	N
2.6.8	Marking of switch acting as disconnect device	See 1.7.8	N
2.6.9	Installation instructions if plug on power supply cord acts as disconnect device	See 1.7.2	N
	Language		—
2.6.11	Interconnected equipment	Certified plug or inlet, earthing connected before phases are connected	P
2.6.12	Multiple power sources	Only one supply connection provided.	N

2.7	Overcurrent and earth fault protection in primary circuits		P
2.7.1	Basic requirements	Equipment relies on 16A rated fuse or circuit breaker of the wall outlet installation protection of the building installation in regard to L to N short circuit. Overcurrent protection is provided by the built-in device fuse in SPS.	P
2.7.2	Protection against faults not covered in 5.4	The protection devices are well dimensioned and mounted.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.7.3	Short-circuit backup protection	Pluggable equipment type A, the building installation is considered as providing short circuit protection	P
2.7.4	Number and location of protective devices	Overcurrent protection by one built-in fuse in SPS.	P
2.7.5	Protection by several devices	Only one fuse.	N
2.7.6	Warning to service personnel	With reversible type plug to the mains, hazardous voltage may be still presented in the equipment after the internal fuse opens. However, as it is considered that the plug to the mains will be disconnected during service work, no marking were requested.	P

2.8	Safety interlock <i>No operator accessible areas which presents hazards in the meaning of this standard.</i>		N
2.8.2	Design		N
2.8.3	Protection against inadvertent reactivation		N
2.8.4	Reliability		N
2.8.5	Overriding an interlock		N
2.8.6.1	Contact gap (mm)		N
2.8.6.2	Switch performing 50 cycles		N
2.8.6.3	Electric strength test: test voltage (V)		N
2.8.7	Protection against overstress		N

2.9	Clearances, creepage distances and distances through insulation		P
	Nominal voltage (V)	AC 100-120/200-240V	—
	General		P
2.9.2	Clearances	See below	P
2.9.2.1	Clearances in primary circuits	All in approved SPS.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
2.9.2.2	Clearances in secondary circuits		P
2.9.3	Creepage distances		P
	CTI tests		—
2.9.4.1	Minimum distances through insulation	In approved SPS.	P
2.9.4.2	Thin sheet material	In approved SPS.	P
	Number of layers (pcs)		P
	Electrical strength test: test voltage (V)		P
2.9.4.3	Printed boards	Not applied for	N
	Distance through insulation		N
	Electric strength test at voltage (V) for thin sheet insulating material		N
	Number of layers (pcs)		N
2.9.4.4	Wound components without interleaved insulation	No wound components without interleaved insulation.	N
	Number of layers (pcs)		N
	Two wires in contact inside component; angle between 45° and 90°		N
	Routine testing for finished component		N
2.9.5	Distances (mm) on coated printed boards	No coated printed wiring boards.	N
	Routine testing for electric strength		N
2.9.6	Enclosed and sealed parts	No hermetically sealed components.	N
	Temperature T1 (°C)		N
	Humidity %		N
2.9.7	Spacings filled by insulating compound	In approved SPS.	P
	Temperature T1 (°C)		N
	Humidity %		N
2.9.8	Component external terminations	In approved SPS.	P
2.9.9	Insulation with varying dimensions	Insulation kept homogenous.	N
2.10	Interconnection of equipment		P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

2.10.1	General requirements	See below.	P
2.10.2	Type of interconnection circuits	Interconnection circuits of SELV through the output connectors. No ELV interconnection circuits.	P
2.10.3	ELV circuits as interconnection circuits	No ELV interconnection.	N

2.11	Limited power source		N
	Use of limited power source	Supplied from the mains.	N

3	WIRING, CONNECTIONS AND SUPPLY		P
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3.1	General		P
3.1.1	Cross-sectional area of internal wiring/interconnecting cables	All internal wires are UL recognized wiring that is PVC insulated, rated VW-1, min. 80°C, 300V. Internal wiring gauge is suitable for current intended to be carried.	P
	Protection of internal wiring and interconnecting cables	No internal wire for primary power distribution.	N
3.1.2	Wireways	Wires do not touch sharp edges and heatsinks which could damage the insulation and cause hazard.	P
3.1.3	Fixing of internal wiring	Internal wires with only basic isolation are routed so that they are not close to any live bare components. The wires are secured by solder pins and quick connect terminals so that a loosening of the terminal connection is unlikely.	P
3.1.4	Fixing of uninsulated conductors	Securely held on PCB. No hazard.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
3.1.5	Insulation of internal wiring	The insulation of the individual conductors are suitable for the application and the working voltage. For the insulation material see 3.1.1.	P
3.1.6	Wires coloured green/yellow only for protective earth connection	See 2.5.5.	P
3.1.7	Fixing of beads and similar ceramic insulators	Not used.	N
3.1.8	Required 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
3.1.9	Reliable electrical connections	All current carrying and safety earthing connections are metal to metal	P
3.1.10	End of stranded conductor	No risk of stranded conductors coming loose.	P
3.1.11	Use of spaced thread screws/thread-cutting screws	No self tapping screws are used.	P

3.2	Connection to primary power		P
3.2.1	Type of connection	Appliance inlet.	P
	Design of product with more than one supply connection	Only one mains supply.	N
3.2.2	Provision for permanent connection	Not permanently connected.	N
	Size (mm) of cables and conduits		N
3.2.3	Appliance inlet	The appliance inlet complies with IEC 60320 and is located at the rear of the unit.	P
3.2.4	Type and cross-sectional area (mm ²) of power supply cord	Not provided for CB Scheme.	N
3.2.5	Cord anchorage		N
	Test: 25 times; 1 s; pull (N)		—

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
	Longitudinal displacement ≤ 2 mm		N
3.2.6	Protection of power supply cord	No parts under this unit likely to damage the power supply cord. No sharp edges	P
3.2.7	Cord guard	<i>see clause 3.2.1</i>	N
	D (mm)		—
	Test: mass (g)		—
	Radius of curvature of the cord ≤ 1.5 D		N
3.2.8	Supply wiring space		N

3.3	Wiring terminals for external power supply conductors <i>Unit with detachable power supply cord, connected on appliance inlet.</i>		N
3.3.1	Terminals		N
3.3.2	Special non-detachable cord		N
	Type of connection		—
	Pull test at 5 N		N
3.3.3	Screws and nuts		N
3.3.4	Fixing of conductors		N
3.3.5	Connection of connectors		N
3.3.6	Size of terminals		N
	Nominal thread diameter (mm)		N
3.3.7	Protection against damage of conductors		N
3.3.8	Terminal location		N
3.3.9	Test with 8 mm stranded wire		N

4	PHYSICAL REQUIREMENTS		P
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4.1	Stability and mechanical hazards		P
4.1.1	Stability tests		P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
	Angle of 10°	This appliance is of a stable mechanical construction and does not overbalance when tilted to an angle of 10° from its normal position.	P
	Test: force (N)	Equipment is not a floorstanding unit.	N
4.1.2	Protection against personal injury	No hazardous moving part	P
4.1.3	Warning and means provided for stopping the moving part	No hazardous moving parts.	N
4.1.4	Edges and corners	Edges and corners of the enclosure are rounded	P
4.1.5	Enclosure of a high pressure lamp	No lamp with cold pressure of 0.2MPa or hot pressure 0.4MPa.	N

4.2	Mechanical strength and stress relief		P
4.2.1	General		P
4.2.2	Internal enclosures 30 N ± 3 N; 5 s	30N force tested on internal enclosure (SPS).	P
4.2.3	External enclosures 250 N ± 10 N; 5 s	250N applied to outer enclosure.	P
4.2.4	Steel ball tests		P
	Fall test	500g steel sphere ball fall, from 1.3m height onto outer enclosure near SPS.	P
	Swing test	500g steel sphere ball as pendulum onto outer enclosure near SPS. No safety relevant damages.	P
4.2.5	Drop test	Desk-top equipment weighted above 5kg	N
4.2.6	Heat test for enclosures of moulded or formed thermoplastic materials: 7 h; T (°C)	Hazardous voltages are contained in the approved SPS. As the SPS is complete enclosed by an earthed metal enclosure which meets the requirements of 2.1.2, the oven test is not considered to be necessary.	N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
4.2.7	Compliance criteria	No safety relevant damages to impact the requirements of 2.1.2, 2.1.5, 2.5.1, 2.5.2, 2.9, 3.2.5, 4.1.2 and 6.2.2.	P
4.2.8	Mechanical strength of cathode ray tubes	Unit does not employ a cathode ray tube	N

4.3	Construction details		P
4.3.1	Changing of setting for different power supply voltages	Voltage range adjustable by user accessible selector switch, wrong adjusted voltage was tested in approved SPS.	P
4.3.2	Adjustment of accessible control devices	None that would cause hazard	P
4.3.4	Prevention of dangerous concentration of dust, powder, liquid and gas	Equipment in intended use not considered to be exposed to these.	N
4.3.5	Fixing of knobs, grips, handles, levers		N
	Test: force (N)		N
4.3.6	Driving belts/couplings shall not ensure electrical insulation	Not used for insulation.	N
4.3.7	Retaining of sleeves	Sleeving on wiring reliable kept in position by cable ties or by the use of heatshrink sleeving	P
4.3.9	Protection of loosening parts	Electrical and mechanical connections can be expected to withstand usual mechanical stress. For the protection, solder pins, cable ties and heatshrink tubing are used	P
4.3.11	Resistance to oil and grease	Insulation not in contact with oil or grease	N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
4.3.12	Protection against harmful concentration of ionizing radiation, ultraviolet light, laser or flammable gases (for and laser see IEC 60825-1)	No ionizing radiation or flammable liquids presents. For CD-ROM Drive, this component was evaluated according to relevant standard for laser product which is IEC 60 825-1 and EN 60 825-1 approved. Therefore, complied with this clause without further test. Laser Class 1 symbol appeared on CD-ROM and in user's manual. The LED power is far below LED class 1 limit.	P
4.3.13	Securing of screwed connections	No connection likely to be exposed to mechanical stress are provided in unit.	P
4.3.15	Openings in the top of enclosure	No openings.	P
	Dimensions (mm)		—
4.3.16	Openings in the sides of enclosure	No bare parts at hazardous voltage within 5° projectary areas.	P
	Dimensions (mm)		—
4.3.17	Interchangeable plugs and sockets	In operator and service area, mismatch of connectors were prevented by incompatible form or location.	P
4.3.18	Torque test for direct plug-in equipment		N
	Additional torque (Nm)		N
4.3.19	Protection against excessive pressure		N
4.3.20	Protection of heating elements in Class I equipment	No heating elements.	N
4.3.21	Protection of lithium batteries		P
	Construction of protection circuit	For RTC battery cell: a) Prevent from force charging by D17 and R157. b) Protected from reverse polarity installation by design of battery compartment.	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
4.3.22	Ageing of barrier/screen secured with adhesive		N
	Day 1: temperature (°C); time (weeks)		N
	Day 8/22/57: a) temperature (°C) for 1 h b) temperature (°C) for 4 h c) temperature (°C) over 8 h		N
	Day 9/23/58: a) relative humidity (%) for 72 h b) temperature (°C) for 1 h c) temperature (°C) for 4 h d) temperature (°C) over 8 h		N

4.4	Resistance to fire		P
4.4.1	Methods of achieving resistance to fire	Use of materials with the required flammability classes.	P
4.4.2	Minimizing the risk of ignition	Electrical parts are not likely to ignite nearby materials. Parts not protected against overheating under fault conditions. Temperatures see 5.1.	P
	Printed board: manufacturer; type; flammability :	See 1.5.1 appended table.	P
4.4.3.2	Material and component: manufacturer; type; flammability	Internal components except small parts are V-2, HF-2 or better.	P
4.4.3.3	Exemptions	Considered.	P
4.4.3.4	Wiring harnesses: manufacturer; flammability ...	Insulating material consists of PVC.	P
4.4.3.5	Cord anchorage bushings: manufacturer; flammability	No cord anchorage.	N
4.4.3.6	Air filter assemblies: manufacturer; flammability :	No air filter assemblies	N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
4.4.4	Enclosures and decorative parts: manufacturer; flammability	Protective enclosure (metal) with decorative front plastic bezel. The front bezel is assumed as decorative part, therefore the flammability class HB of that plastic material was acceptable.	P
4.4.5	Conditions for fire enclosures	See 4.4.5.1	P
4.4.5.1	Components which require fire enclosure: manufacturer; flammability	With having the following components: <ul style="list-style-type: none"> ■ components with windings ■ wiring ■ semiconductor devices, transistors, diodes, integrated circuits ■ resistors, capacitors, inductors the fire enclosure is required.	P
4.4.5.2	Components not requiring fire enclosure	See 4.4.5.1	N
4.4.6	Fire enclosure construction	Protection against emission of flame, molten metal, flaming or glowing particles or drops by the fire enclosure with on bottom openings.	P
4.4.7	Doors and covers	No door or cover within fire enclosure.	N
4.4.8	Flammable liquids	No flammable liquids in this unit.	N

5	THERMAL AND ELECTRICAL REQUIREMENTS	P
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5.1	Heating	P
	Heating tests	(see appended table) P

5.2	Earth leakage current	P
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IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
5.2.1	General	The leakage current was measured from primary to chassis.	P
5.2.2	Leakage current	(see attached tables)	P
	Test voltage (V)	(see attached table)	—
	Measured current (mA)	(see attached table)	—
	Max. allowed current (mA)	3.5mA	—
5.2.3	Single-phase equipment	See 5.2.2	P
	Test voltage (V)		—
	Measured current (mA)		—
	Max. allowed current (mA)		—
5.2.4	Three-phase equipment	Single phase equipment	N
	Test voltage (V)		—
	Measured current (mA)		—
	Max. allowed current (mA)		—
5.2.5	Equipment with earth leakage current exceeding 3.5 mA	Leakage current does not exceed 3.5mA	N
	Test voltage (V)		—
	Measured current (mA)		—
	Max. allowed current (mA)		—
	Cross-sectional area (mm ²) of internal protective earthing conductor		—
	Warning label		N

5.3	Electric strength		P
5.3.1	General	All tests voltages were applied for 1minute in the chamber after the humidity test of 2.2.3 and in warm conditions after the heating test of 5.1. No isolation breakdown was observed (results see appended tables).	P
5.3.2	Test procedure	(see appended table)	P

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

5.4	Abnormal operating and fault conditions		P
5.4.2	Motors	Approved components used.	P
5.4.3	Transformers	The protection of the SPS and transformer are approved with the approval of the SPS.	P
5.4.4	Compliance of operational insulation <i>Power supply is approved component, the over-current protection of the power supply ensures that there occur no hazard if there is short circuit in the SELV circuit.</i>		P
	Method used		N
5.4.5	Electromechanical components in secondary circuits	No electromechanical components.	N
5.4.6	Other components and circuits	Faults in primary and secondary components and operational insulation were already considered during the approval of the SPS. No other abnormal tests necessary.	N
5.4.7	Test in any expected condition and foreseeable misuse	Ventilation blocked and DC fan locked test: Result see appended table. No hazard by operating buttons and controls not in accordance with the instructions.	P
5.4.8	Unattended use of equipment having thermostats, temperature limiters etc.	None of them are used.	N
5.4.9	Compliance	No fire propagated beyond the equipment. No molten metal was emitted.	P
5.4.10	Ball-pressure test of thermoplastic parts; impression shall not exceed 2 mm	None of them outside the approved SPS.	N

6	CONNECTION TO TELECOMMUNICATION NETWORKS <i>Equipment is not intended to be connected to TNV.</i>	N
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IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

6.1	General		N
6.2	TNV circuits		N
6.2.1.1	Limits of the TNV circuits		N
6.2.1.1 a)	TNV-1 circuits		N
6.2.1.1 b)	TNV-2 and TNV-3 circuits		N
6.2.1.2	Separation from other circuits and from accessible parts		N
	Voltage (V) in SELV circuits, TNV-1 circuits and accessible conductive parts in event of single insulation fault or component failure		N
6.2.1.3	Operating voltages generated externally		N
	Voltage (V) in SELV circuit, TNV-1 circuit or accessible conductive part		N
6.2.1.4	Separation from hazardous voltages		N
	Insulation between TNV circuit and circuit at hazardous voltage		N
	Method used		N
6.2.1.5	Connection of TNV circuits to other circuits		N
	TNV circuit supplied conductively from a secondary circuit		N
6.2.2.1	Protection against contact with bare conductive parts of TNV-2 and TNV-3 circuits		N
	Test with test finger		N
	Test with test probe		N
6.2.2.2	Battery compartments		N
	Marking next to door/on door		N

6.3	Protection of telecommunication network service personnel, and users of other equipment connected to the telecommunication network, from hazards in the equipment		N
6.3.1	Protection from hazardous voltages		N
6.3.2	Use of protective earthing		N
	Language of installation instructions		N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
6.3.3.1	Insulation between TNV circuit and parts or circuitry that may be earthed		N
6.3.3.2	Exclusions		N
6.3.4.1	Limitation of leakage current (mA) to telecommunication network		N
6.3.4.2	Summation of leakage currents from telecommunication network		N

6.4	Protection of the equipment user from voltages on the telecommunication network		N
6.4.1	Separation requirements		N
6.4.2	Test procedure		N
6.4.2.1	Impulse test: separation between TNV-1 circuits/TNV-3 circuits and:		N
6.4.2.1 a)	unearthed conductive parts/non-conductive parts of the equipment expected to be held or touched during normal use; test at 2.5 kV		N
6.4.2.1 b)	parts and circuitry that can be touched by the test finger except contacts of connectors that cannot be touched by test probe; test at 1.5 kV		N
6.4.2.1 c)	circuitry which is provided for connection of other equipment; test at 1.5 kV		N
6.4.2.2	Electric strength test: separation between TNV-1 circuits/TNV-3 circuits and:		N
6.4.2.2 a)	unearthed conductive parts/non-conductive parts of the equipment expected to be held or touched during normal use; test at 1.5 kV		N
6.4.2.2 b)	parts and circuitry that can be touched by the test finger except contacts of connectors that cannot be touched by test probe; test at 1.0 kV		N
6.4.2.2 c)	circuitry which is provided for connection of other equipment; test at 1.0 kV		N
6.4.2.3	Compliance criteria		N

6.5	Protection of telecommunication wiring system from overheating		N
	Maximum continuous output current (A)		N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		N
A.1	Flammability test for fire enclosures of moveable equipment having a total mass exceeding 18 kg, and of stationary equipment		N
A.2	Flammability test for fire enclosures of moveable equipment having a total mass not exceeding 18 kg, and for materials located within fire enclosures		N
A.3	High current arcing ignition test		N
A.3.6	Number of arcs		N
A.4	Hot wire ignition test		N
A.4.6	Ignition time (s)		N
A.5	Hot flaming oil test		N
A.6	Flammability test for classifying materials V-0, V-1 or V-2		N
A.7	Flammability test for classifying foamed materials HF-1, HF-2 or HBF		N
A.8	Flammability test for classifying materials HB		N
A.9	Flammability test for classifying materials 5V		N
A	Tested material		N
	Preconditioning: 7 days (168 h); temperature (°C)		—
	Mounting of samples during test		—
	Wall thickness		—
	Sample 1 burning time		N
	Sample 2 burning time		N
	Sample 3 burning time		N
	Material: compliance with the requirements		N
	Manufacturer of tested material		—
	Type of tested material		—
	Additional information		—

B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS		N
B.1	General requirements		N
	Position		—
	Manufacturer		—

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict
	Type		—
	Rated voltage (V) or current (A)		—
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N
	Test duration (days)		—
	Electric strength test: test voltage (V)		—
B.6	Running overload test for DC motor in secondary circuits		N
B.7	Locked-rotor overload test for DC motor in secondary circuits		N
B.7.2	Test time (h)		N
B.7.3	Test time (h)		N
B.8	Test for motors with capacitors		N
B.9	Test for three-phase motors		N
B.10	Test for series motors		N
	Test voltage (V)		—

C	ANNEX C, TRANSFORMERS		N
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—
	Temperatures		N
	Thermal cut-out		N
C.1	Overload test		N
	Conventional transformer		N
C.2	Insulation		
	Precautions		N
	Retaining of end turns of all windings		N
	Earthing test at 25 A		N
C.3	Electric strength test		N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

H	ANNEX H, IONIZING RADIATION		N
	Ionizing radiation		N
	Measured radiation		—
	Measured high-voltage (kV)		—
	Measured focus voltage (kV)		—
	CRT markings		—
	Certified by		—
	Standard used		—

U	ANNEX U, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		N
	See separate test report		N

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
Switching Power Supply	Bestec Power Electronics Co., Ltd.	ATX-120	I/P : 100-120/200- 240Vac, 50/60Hz, 3/1.5A O/P : +5V/14A, +3.3V/6A +12V/2A, -12V/0.3A +5Vsb/0.72A	IEC 60950	TÜV, UL, CB (by TÜV Rheinland)	
	Bestec Power Electronics Co., Ltd.	ATX-1523F	I/P : 100-120/200- 240Vac, 50/60Hz, 4/2A O/P : +5V/16A, +3.3V/9A +12V/4A, -12V/0.8A +5Vsb/1.5A	IEC 60950	TÜV, UL, CB (by TÜV Rheinland)	
Floppy Disk Drive (Optional)	Sony corp.	MPF720-xxx MFD720-xxx	5V, 730mA	IEC 60950	TÜV, UL	
Hard Disk Drive	IBM Japan Ltd.	DDYX-Tnnnnn (X=S, P, or A n=0-9)	5V/0.75A 12V/1.1A	IEC 60950	TÜV, UL	
	Fujitsu Ltd.	MAJ3xxxMy (x=0-9 y=a-z or blank)	5V/1.0A 12V/1.2A	IEC 60950	TÜV, UL	
	Seagate Technology Inc.	ST336704LC	12V/1.1A	IEC 60950	TÜV, UL	
	Seagate Technology Inc.	ST318451LC	5V/varies 12V/varies	IEC 60950	TÜV, UL	
	Seagate Technology Inc.	9N2*	5V/0.95A 12V/0.55A	IEC 60950	TÜV, UL	
	Seagate Technology Inc.	9P4*	5V/0.80A 12V/0.83A	IEC 60950	TÜV, UL	
CD-ROM Drive (Optional)	Samsung Electronics Co., Ltd.	SN-124	5V, 1.5A Laser Class I	IEC 60825-1 IEC 60950	TÜV, UL, CSA	

IEC 60 950					
Clause	Requirement – Test			Result - Remark	Verdict
	Teac Corporation	CD-2XXXX (X is alphanumeric characters or blank)	5V, 1.5A Laser Class I	IEC 60825-1 IEC 60950	TÜV, UL, CSA
	Lite-On	LTN- XX5XXXXX (X = A-Z, 0-9 or blank)	5V, 1A Laser Class I	IEC 60825-1 IEC 60950	TÜV, UL, CSA
RTC Battery	Sony	CR2032	Lithium type, DC 3V, 220mAh	--	UL
	Matsushita electric Industry	CR2032	Lithium type, DC 3V, 220mAh	--	UL
	Toshiba Battery Co., Ltd	CR2032	Lithium type, DC 3V, 220mAh	--	UL
	Hitachi Maxell	CR2032	Lithium type, DC 3V, 220mAh	--	UL
	MAXELL	CR2032	Lithium type, DC 3V, 220mAh	--	UL
CPU DC FAN	Asia Vital Components Co., Ltd.	C6010T12H	12V, 0.1A, 15.779CFM	IEC 60950	TÜV, UL
Printed Wiring Board	--	--	V-1 min., 105° C	UL 94	UL
Front bezel	--	--	HB min.	UL 94	UL
Metal enclosure material	--	--	Steel, thickness = 0.8 mm	--	--
1) an asterisk indicates a mark which assures the agreed level of surveillance					

1.6		TABLE: electrical data (in normal conditions)					P
fuse #	Rated (A)	U (V)	P (W)	I (A)	Ifuse (A)	condition/status	
PC operated with Bestec SPS model ATX-120							
Fuse	--	90/47Hz	79.9	1.39	1.39	Unit at normal load	
Fuse	--	90/63Hz	79.7	1.38	1.38	dto	

IEC 60 950						
Clause	Requirement – Test			Result - Remark		Verdict
Fuse	3	100/47Hz	80.4	1.29	1.29	dto
Fuse	3	100/63Hz	80.4	1.28	1.28	dto
Fuse	3	120/47Hz	81.8	1.13	1.13	dto
Fuse	3	120/47Hz	82.1	1.12	1.12	dto
Fuse	--	127/47Hz	82.1	1.09	1.09	dto
Fuse	--	127/47Hz	82.5	1.08	1.08	dto
Fuse	--	180/47Hz	78.6	0.73	0.73	dto
Fuse	--	180/63Hz	78.6	0.72	0.72	dto
Fuse	1.5	200/47Hz	79.3	0.68	0.68	dto
Fuse	1.5	200/63Hz	79.2	0.67	0.67	dto
Fuse	1.5	240/47Hz	80.7	0.60	0.60	dto
Fuse	1.5	240/47Hz	80.8	0.59	0.59	dto
Fuse	--	254/47Hz	83.9	0.59	0.59	dto
Fuse	--	254/63Hz	83.7	0.59	0.59	dto
PC operated with Bestec SPS model ATX-1523F						
Fuse	--	90/47Hz	74.6	1.32	1.32	Unit at normal load
Fuse	--	90/63Hz	74.5	1.32	1.32	dto
Fuse	3	100/47Hz	74.5	1.22	1.22	dto
Fuse	3	100/63Hz	74.5	1.22	1.22	dto
Fuse	3	120/47Hz	75.5	1.07	1.07	dto
Fuse	3	120/47Hz	75.3	1.06	1.06	dto
Fuse	--	127/47Hz	75.8	1.03	1.03	dto
Fuse	--	127/47Hz	76.1	1.02	1.02	dto
Fuse	--	180/47Hz	74.1	0.55	0.55	dto
Fuse	--	180/63Hz	74.0	0.54	0.54	dto
Fuse	1.5	200/47Hz	74.1	0.50	0.50	dto
Fuse	1.5	200/63Hz	73.9	0.49	0.49	dto
Fuse	1.5	240/47Hz	74.8	0.43	0.43	dto
Fuse	1.5	240/47Hz	74.7	0.42	0.42	dto
Fuse	--	254/47Hz	75.2	0.41	0.41	dto
Fuse	--	254/63Hz	75.2	0.40	0.40	dto

IEC 60 950			
Clause	Requirement – Test	Result - Remark	Verdict

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2.5.11	TABLE: ground continue test			P
Location	Resistant measured (Ω)	Comments		
Inlet ground pin to metal enclosure	0.008	25A test current, 1 minutes		
Inlet ground pin to metal enclosure	0.008	30A test current, 2 minutes		

2.9.2 and 2.9.3	TABLE: clearance and creepage distance measurements					N
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)

2.9.4.1	TABLE: distance through insulation measurements			N
distance through insulation di at/of:	U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)