TEST REPORT

IEC 950

Safety of information technology equipment

Report

Reference No. ..... : <12002019 001>

Compiled by (+ signature) ..... : F. Piller

Approved by (+ signature) ..... : B. Wenzel

Date of issue ..... : 27 March, 2002

Contents ..... : 104 pages

..... :

This report is based on a blank test report that was prepared by KEMA using information obtained from the TRF originator (see below).

Testing laboratory

Name ..... : 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

..... :

Client

Name ..... : Sirtec International Co., Ltd.

Address ..... : 9F-2, No. 4, Lane 609, Sec. 5, Chung Hsing Rd., San Chung, Taipei Hsien 241, Taiwan, R.O.C.

..... :

Test specification

Standard ..... : IEC 60950:1991+A1:1992 + A2:1993 + A3:1995 + A4:1996
EN 60950:1992+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/NZS 3260-1993

Test procedure ..... : CB-scheme

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

Non-standard test method ..... : N.A.

..... :

Test Report Form/blank test report

Test Report Form No. ..... : I950__D/97-06

TRF originator ..... : FIMKO

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

Test item	
Description	Switching Power Supply
Trademark	Trademark of HIGH POWER, Enlight, CHIEFTEC
Model and/or type reference	1) HPC-360-10z (HIGH POWER, CHIEFTEC), EN-8361934A1 (Enlight) 2) HPC-360-10z DF(HIGH POWER, CHIEFTEC), EN-8360934A1(Enlight) 3) HPC-360-20z (HIGH POWER, CHIEFTEC), EN-8361734A1 (Enlight) 4) HPC-360-30z (HIGH POWER, CHIEFTEC), EN-8361834A1 (Enlight) 5) HPC-360-30z DF (HIGH POWER, CHIEFTEC), EN-8360834A1 (Enlight) 6) HPC-420-10z DF (HIGH POWER, CHIEFTEC), EN-8420934A1 (Enlight) 7) HPC-420-30z DF (HIGH POWER, CHIEFTEC), EN-8420734A1 (Enlight) where z = 0-9, A-Z or blank
Manufacturer	Same as applicant
Rating(s)	i/p: See page 4 for details. o/p: See page 4 for details.

Particulars: test item vs. test requirements	
Equipment mobility	Equipment for building-in
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)	< 3kg
Protection against ingress of water	IPX0

Test case verdicts	
Test case does not apply to the test object	N(.A.)
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)

Testing	
Date of receipt of test item	March, 2002
Date(s) of performance of test	--

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 comma is used as the decimal separator.

Factories:

Sirfa (Dong Guan) Electronic Co., Ltd.

No. 2, Block 6, 178, Industrial Park, Tongxia, Dongguan, Guandong, P.R. China

Comments:

Brief description of the test sample:

The equipment models HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF and HPC-420-30z DF are series switching power supply (building-in type) for the use in information technology equipment. In models "10" stand without PFC function, "20" stand with passive PFC function, "30" stand with active PFC function, "DF" stand two DC fans used in the unit, which "z" can be 0-9, A-Z or blank for marketing purpose.

Model different descriptions:

The models EN-8361934A1, EN-8360934A1, EN-8361734A1, EN-8361834A1, EN-8360834A1, EN-8420934A1, EN-8420734A1 are identical to models HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF and HPC-420-30z DF except for type designation and trademark.

Model HPC-360-10z DF is similar to model HPC-360-10z except as below:

a. type designation
b. two DC fans used
c. different size of primary heatsink

Model HPC-360-20z is similar to model HPC-360-10z except as below:

a. type designation
b. with passive PFC choke
c. with PFC board (optional)

Model HPC-360-30z is similar to model HPC-360-10z except for as below:

a. type designation
b. input ratings
c. without select switch
d. with active PFC choke on PFC board
e. different size of primary heasink
f. different T4

Model HPC-360-30z DF is similar to model HPC-360-30z except as below:

a. type designation
b. two DC fans used

Model HPC-420-10z DF is similar to model HPC-360-10z DF except as below:

a. type designation
b. input current rating
c. output ratings
d. different size of primary heatsink

Model HPC-420-30z DF is similar to model HPC-420-10z DF except as bellow:

a. type designation
b. input ratings

c. without select switch
d. with active PFC choke on PFC board
e. different size of primary heatsink
f. different T4

The test samples were pre-production without serial number. Otherwise specified the tests have been performed on model HPC-360-30z and HPC-420-30z DF to show the similarities to the other models.

Output ratings:

Model No.	AC Input	DC Output Ratings								
		+5V	+12 V	+3.3 V	-5V	-12V	+5VSB	Output (W) for +5V & +3.3V	Output (W) for +5V & +3.3V & +12V	Total Output (W)
HPC-360-10z **HPC-360-10z DF** **HPC-360-20z**	115/230V, 50-60Hz, 8/5A	30A or 35A	17A	28A	0.3A	0.8 A	2A	200 or 220	285 or 340	300 or 360
HPC-360-30z **HPC-360-30z DF**	100-240V or 200-240V, 50-60Hz, 8A									
HPC-420-10z DF	115/230V, 50-60Hz, 10/5A	35A or 40A	18A	30A	0.3A	0.8 A	2A	220	400	420
HPC-420-30z DF	100-240V or 200-240V, 50-60Hz, 8A									

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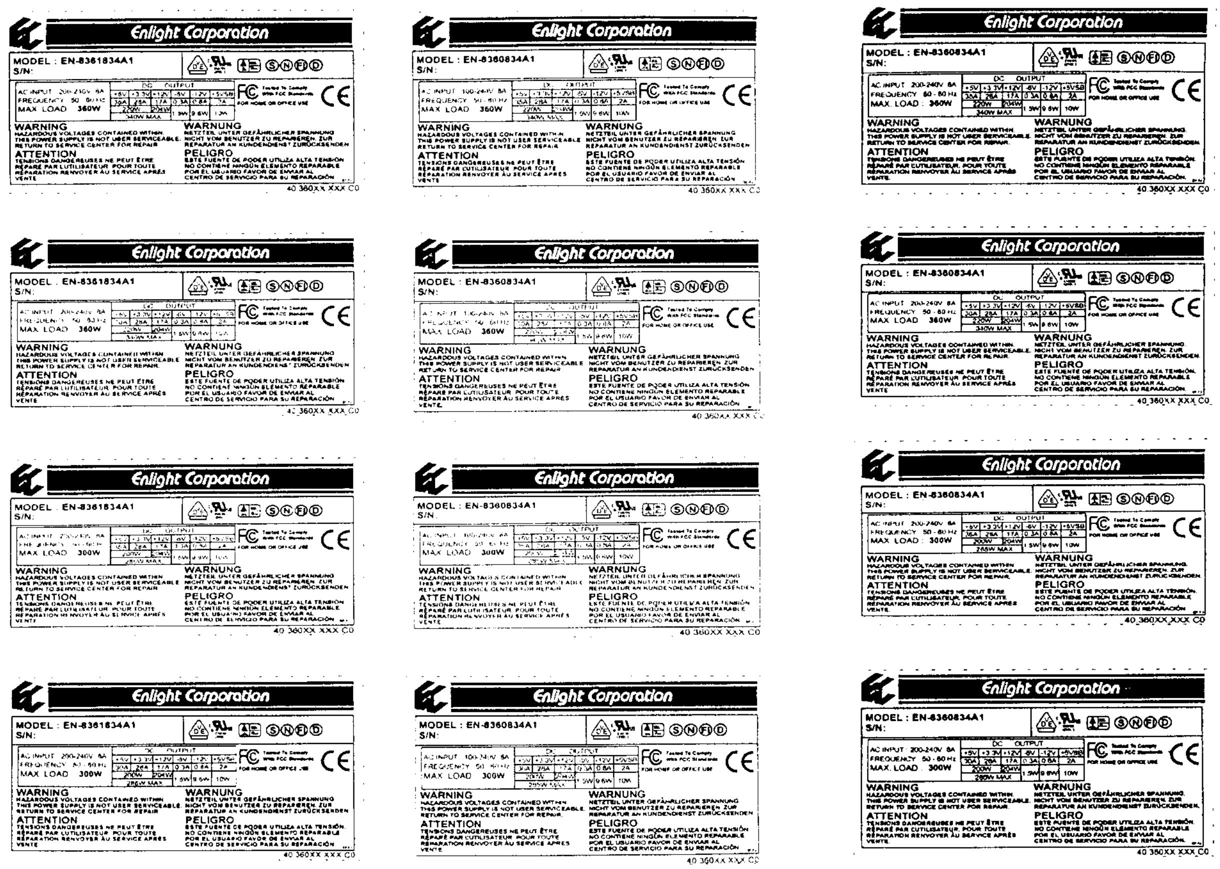

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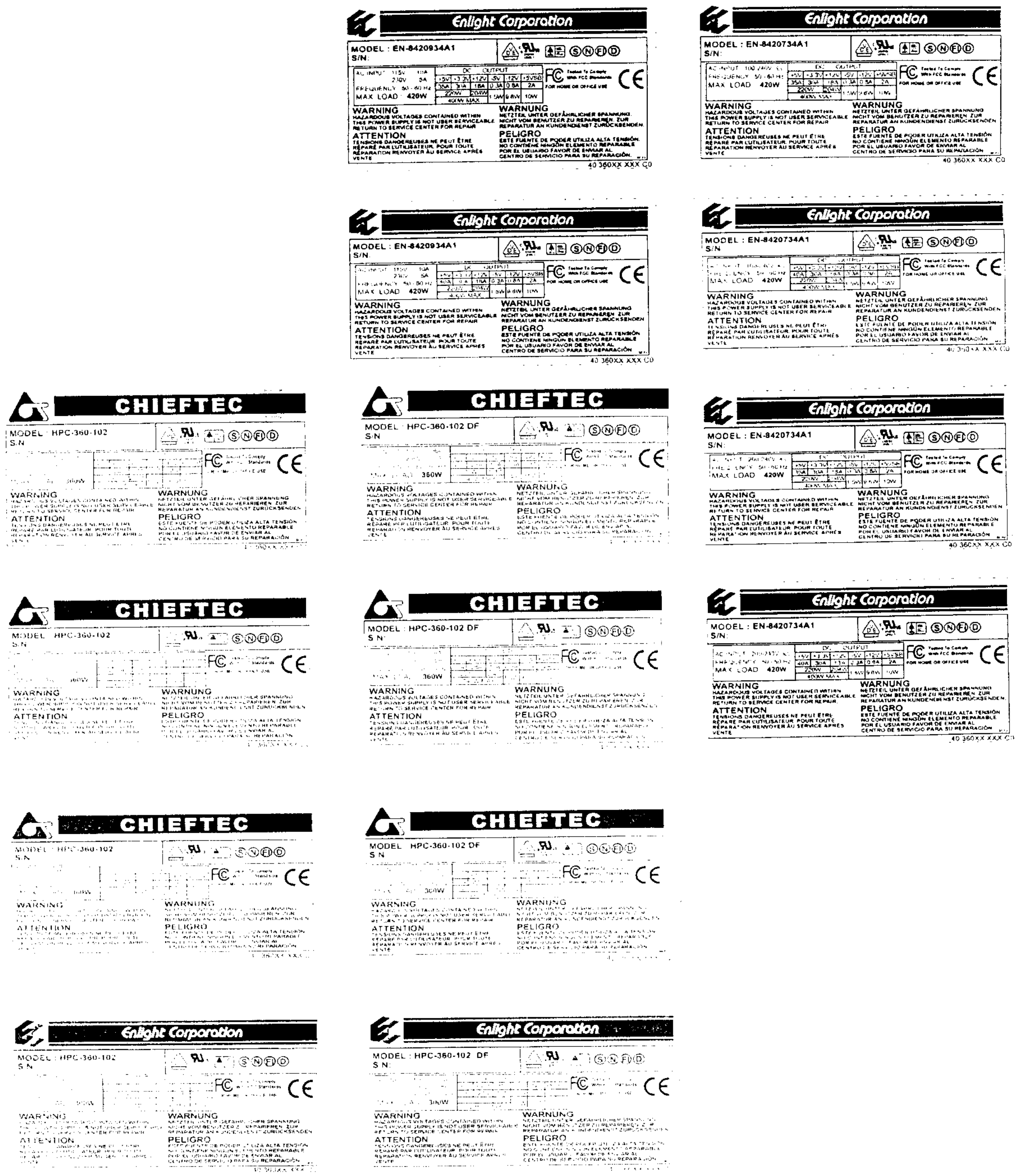

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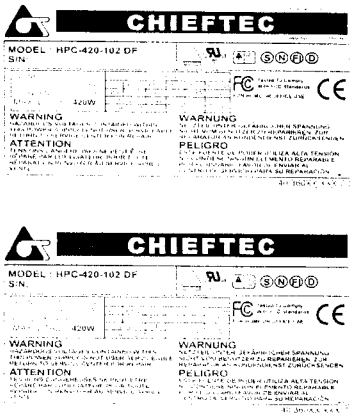

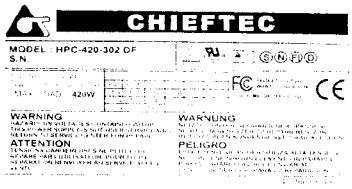

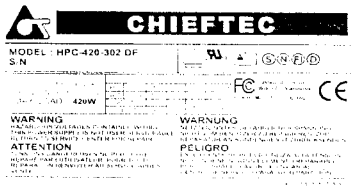

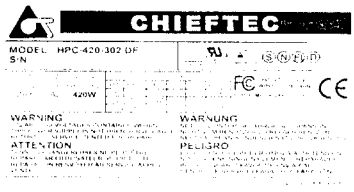

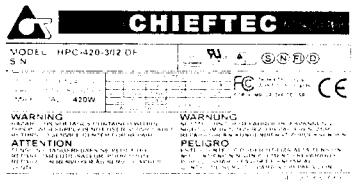

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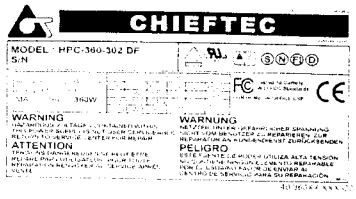

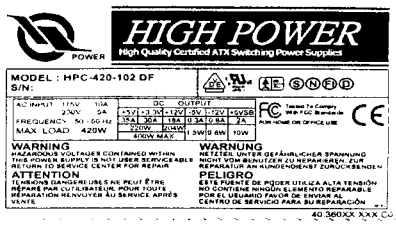

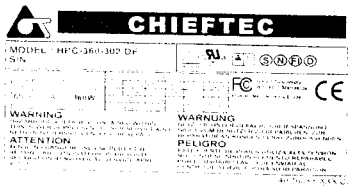

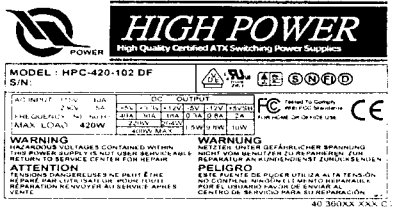

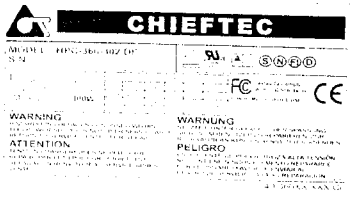

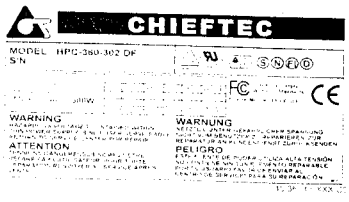

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
1	GENERAL		P
1.5	Components		P
1.5.1	Comply with IEC 950 or relevant component standard	(see appended tables)	P
1.5.2	Evaluation and testing of components	Components which are certified to IEC and /or national standards are used correctly within 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 direct 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 o/p cable to other device is carrying only SELV on an energy level below 240VA. → Except the insulation material, there are no further requirements to the o/p interconnection cable.	P
1.5.6	Mains capacitors	X2 capacitor according to IEC 60384-14:1993 with 21 days damp heat test.	P
1.6	Power interface		P
1.6.1	Steady state input current	Highest load according to 1.2.2.1 for this equipment is	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		the operation with the max. specified DC-load. results see appended table	
	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) .....:	+10%, -10% Documentation specifies a rating of AC 115V/230V or 100-240V at 50-60Hz. Relevant tests were done with the range of 103.3-253V or 90-264V at 50-60Hz.	P

1.7	Marking and instructions		P
1.7.1	Rated voltage (V) .....:	See *"brief description of the test sample"* for details	P
	Symbol of nature of supply for d.c. .....:	mains from AC source	N
	Rated frequency (Hz) .....:	50-60Hz	P
	Rated current (A) .....:	See *"brief description of the test sample"* for details	P
	Manufacturer .....:	Not shown.	N
	Trademark .....:	HIGH POWER or Enlight Corporation or CHIEFTEC	P
	Type/model .....:	See page 2 for details.	P
	Symbol of Class II .....:	Class I equipment	N
	Certification marks .....:	TÜV Rheinland Bauart mark, others see on copy of the	N

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		marking plate	
1.7.2	Safety instructions	Installation instruction with directions to maintain the requirements of IEC 60950 with installation in end system. Included are directions regarding the max. o/p, the max. ambient temperature and that the requirements of the IEC 60950 must be observed with the installation in the final system	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 .....:	For model HPC-420-10z DF: F1 T 10A / 250V For other models: F1 T 8A / 250V	P
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 .....:	Power switch located next to the appliance inlet.	P
1.7.8.2	Colours of controls and indicators .....:	Black colour for power switch knob. Red colour for select switch knob. (For model: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-420-10z DF)	P
1.7.8.3	Symbols according to IEC 417 .....:	Power switch with "O" and "I" marked accordingly.	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
1.7.8.4	Figures used for marking .....:	115/230 for select switch. (For model: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-420-10z DF)	P
1.7.8.5	Location of markings and indications for switches and controls .....:	Markings of power switch placed on the knob.	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	Statement will be given when applied for corresponding national approval.	N
1.7.11	Instructions when protection relies on building installation	The equipment is intended to be used in equipment to be connected to 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	Installation instruction and marking in English. Versions in other languages will be provided when national certificate approval.	P
	Language .....:	English	—
1.7.15	Durability and legibility	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. After this test there was no damage to the label. The marking on the label did not fade. There was neither curling nor lifting of the label edge.	P
1.7.16	Removable parts	No markings placed on removable parts.	P
1.7.17	Warning text for replaceable lithium batteries	No lithium battery	N
	Language .....:		—

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
1.7.18	Operator access with a tool .....:	Power supply is for building-in.	N
1.7.19	Equipment for restricted access locations .....:	No restricted access location.	N
2	PROTECTION FROM HAZARDS		P
2.1	Protection against electric shock and energy hazards		P
2.1.1	Access to energized parts	See below	N
2.1.2	Protection in operator access areas	The accessibility of hazardous or ELV voltages are prevented with the final system. The inspection with test pin and test finger should therefore be conducted with the approval of the end system. Installation instruction requires, that the requirements of the IEC 60 950 must be observed to the installation.	N
	Test by inspection .....:	dto	N
	Test with test finger .....:	dto	N
	Test with test pin .....:	dto	N
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	SPS is not intended to be used in restricted locations	N
2.1.5	Energy hazard in operator access area	Energy does not exceed 240VA between any two points in output connector of secondary circuit. Result see appended table.	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
2.1.6	Clearances behind conductive enclosures	Refer to 4.2.	N
2.1.7	Shafts of manual controls	Not applicable for building in	N
2.1.8	Isolation of manual controls	None at ELV or hazardous voltage	N
2.1.9	Conductive casings of capacitors	Casings of capacitors are considered as if directly connected to the respective circuitry. None at hazardous voltage accessible	P
2.1.10	Risk of electric shock from stored charge on capacitors connected to mains circuit	No risk of electric shock, see below.	P
	Time-constant (s); measured voltage (V) .....:	<1s (see appended table)	—
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: 120 hours	P
	Humidity (%) .....:	95% R.H.	—
	Temperature (°C) .....:	40°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
2.2.7.1	General rules for working voltages	The rms and the peak voltage were measured on the switching power supply. The unit was connected to a	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		240V TN power system and secondary ground was maintained during measurement. Results see appended table.	
2.2.7.2	Clearances in primary circuits	Considered	P
2.2.7.3	Clearances in secondary circuits	See 5.4.4.	N
2.2.7.4	Creepage distances	Considered	P
2.2.7.5	Electric strength tests	Considered	P
2.2.8.1	Bridging capacitors .....:	No component bridged reinforced or double insulation.	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, see abnormal results 5.4.6.	—
	Method used for separation .....:	Method 1	P
2.3.4	Additional constructional requirements	In multiway connectors and other cable ties prevent contact to hazardous parts in case of loosening of connection or conductor breakage.	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		IEC 60083 and IEC 60320 connectors are not used in SELV.	
2.3.5	Connection of SELV circuits to other circuits	See 2.3.2 and 2.3.3. No direct connection between SELV and any primary circuits.	N
2.3.8	Construction of SELV circuits		N
2.3.9	SELV circuits connected to other circuits		N

2.4	Limited current circuits		N
2.4.2	Frequency (Hz) .....:		—
	Measured current (mA) .....:		N
2.4.3	Measured voltage (V) .....:		—
	Measured capacitance (μF) .....:		N
2.4.4	Measured voltage (V) .....:		—
	Measured charge ((μF) .....:		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
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	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		comprise class I and class II.	
2.5.5	Green/yellow insulation	Green/yellow wire from inlet to chassis. Green/yellow wire to 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 ≤ 0,1 Ω	≤ 0.1 Ω, see below.	P
	Test current (A) .....:	(see appended table)	—

2.6	Disconnection from primary power		P
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, there is no remaining parts with hazardous voltage in the equipment.	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
2.6.5	Switches in flexible cords	No isolation switch provided.	N
2.6.6	Disconnection of both poles simultaneously in single-phase equipment	The appliance 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	P
2.7.2	Protection against faults not covered in 5.4	The protection devices are well dimensioned and mounted.	P
2.7.3	Short-circuit backup protection	The final system is considered to be pluggable equipment type A, the building installation is considered as providing short circuit backup protection.	P
2.7.4	Number and location of protective devices .....:	Overcurrent protection by one built-in fuse.	P
2.7.5	Protection by several devices	Only one fuse.	N
2.7.6	Warning to service personnel	With reversible plug of the final system to the mains, hazardous voltage may be	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		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.	

2.8	Safety interlocks		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 240V	—
	General		P
2.9.2	Clearances	See below	P
2.9.2.1	Clearances in primary circuits	(see appended table 2.9.2 and 2.9.3)	P
2.9.2.2	Clearances in secondary circuits	In compliance with 5.4.4.	N
2.9.3	Creepage distances	(see appended table 2.9.2 and 2.9.3)	P
	CTI tests .....:	CTI rating for all materials of min. 100.	—
2.9.4.1	Minimum distances through insulation	(see appended table 2.9.4)	P
2.9.4.2	Thin sheet material	The thin sheet materials of polyester tape used in transformers T2, T3 and T4.	P
	Number of layers (pcs) .....:	3 layers	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
	Electrical strength test: test voltage (V) .....:	3000V ac applied on any combination of two layers	P
2.9.4.3	Printed boards	Not applied for	N
	Distance through insulation		N
	Electric strength test at voltage 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 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 component.	N
	Temperature T1 (°C) .....:		N
	Humidity % .....:		N
2.9.7	Spacings filled by insulating compound	Optocoupler is an approved component. Other components not applied for. (see appended table 2.9.4 and 5.3)	P
	Temperature T1 (°C) .....:		N
	Humidity % .....:		N
2.9.8	Component external terminations	(see appended table 2.9.2 and 2.9.3)	P
2.9.9	Insulation with varying dimensions	Insulation kept homogenous.	N

2.10	Interconnection of equipment		P
2.10.1	General requirements	This power supply is not considered for connection to TNV.	N

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
2.10.2	Type of interconnection circuits .....:	Interconnection circuits of SELV through the connector. 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 .....:	Supply from the mains. The testing whether the o/p complies with the requirements of the limited power source should be conducted with the approval of the end system.	N
3	WIRING, CONNECTIONS AND SUPPLY		P
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 heat sinks 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	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		hazard.	
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 .....:	The appliance inlet in equipment only for one mains connection	N
3.2.2	Provision for permanent connection .....:	See clause 3.2.1	N
	Size (mm) of cables and conduits .....:		N
3.2.3	Appliance inlet	The appliance inlet complies with IEC 60320.	P
3.2.4	Type and cross-sectional area (mm²) of power supply cord .....:	The power supply cord is not provided with this unit. Evaluation of the clause	N

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		should be made with final system assembly	
3.2.5	Cord anchorage		N
	Test: 25 times; 1 s; pull (N) .....:		—
	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		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 *Unit with detachable power supply cord, connected on appliance inlet.*		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

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
4	PHYSICAL REQUIREMENTS		P
4.1	Stability and mechanical hazards *The switching power supply is for built-in. Stability and mechanical hazards are to be evaluated in the final product.*		N
4.1.1	Stability tests		N
	Angle of 10°		N
	Test: force (N) .....:		N
4.1.2	Protection against personal injury		N
4.1.3	Warning and means provided for stopping the moving part .....:		N
4.1.4	Edges and corners		N
4.1.5	Enclosure of a high pressure lamp		N
4.2	Mechanical strength and stress relief		P
4.2.1	General	The switching power supply is for building-in equipment. It has to be evaluated in the final product.	N
4.2.2	Internal enclosures 30 N ± 3 N; 5 s	30N force applied to metal chassis.	P
4.2.3	External enclosures 250 N ± 10 N; 5 s	Building-in type.	N
4.2.4	Steel ball tests		N
	Fall test	Building-in type.	N
	Swing test	Building-in type.	N
4.2.5	Drop test	Building-in type.	N
4.2.6	Heat test for enclosures of moulded or formed thermoplastic materials: 7 h; T (°C) .....:	Metal chassis.	N
4.2.7	Compliance criteria	Complied.	P
4.2.8	Mechanical strength of cathode ray tubes	Unit does not employ a cathode ray tube	N

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
4.3	Construction details		P
4.3.1	Changing of setting for different power supply voltages		P
4.3.2	Adjustment of accessible control devices	No control.	N
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	Sleevings on wiring reliable kept in position by cable ties or by the use of heatshrunk 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 heatshrunk tubing are used	P
4.3.11	Resistance to oil and grease	Insulation not in contact with oil or grease	N
4.3.12	Protection against harmful concentration of ionizing radiation, ultraviolet light, laser or flammable gases (for laser see IEC 825-1)	No ionizing radiation, LED, laser or flammable liquids presents.	N
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	Not applicable for building in component	N
	Dimensions (mm) .....:		—
4.3.16	Openings in the sides of enclosure	Not applicable for building in component	N
	Dimensions (mm) .....:		—
4.3.17	Interchangeable plugs and sockets		N

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
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		N
	Construction of protection circuit .....:		N
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	Flammability of materials and components	See below.	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

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
4.4.3.5	Cord anchorage bushings: manufacturer; flammability .....:	No cord anchorage bushings	N
4.4.3.6	Air filter assemblies: manufacturer; flammability :	No air filter assemblies	N
4.4.4	Enclosures and decorative parts: manufacturer; type; flammability .....:	Metal enclosure.	N
4.4.5	Conditions for fire enclosures	With having the following components: • components with windings • wiring • semiconductor devices, transistors, diodes, integrated circuits • resistors, capacitors, inductors the fire enclosure is required. However, with this unit as a building-in component, the meeting of the requirements are to be observed with the approval of the final system.	N
4.4.5.1	Components requiring fire enclosure: manufacturer; flammability .....:		N
4.4.5.2	Components not requiring fire enclosure .....:		N
4.4.6	Fire enclosure construction		N
4.4.7	Doors or covers in fire enclosures		N
4.4.8	Flammable liquids		N
5	THERMAL AND ELECTRICAL REQUIREMENTS		P
5.1	Heating		P
	Heating tests	(see appended table)	P
5.2	Earth leakage current		P
5.2.1	General	The leakage current was measured from primary to	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
		chassis.	
5.2.2	Leakage current	See 5.2.3.	P
	Test voltage (V) .....:		—
	Measured current (mA) .....:		—
	Max. allowed current (mA) .....:		—
5.2.3	Single-phase equipment	(see appended table)	P
	Test voltage (V) .....:	(see appended table)	—
	Measured current (mA) .....:	(see appended table)	—
	Max. allowed current (mA) .....:	3.5mA	—
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		N
	Test voltage (V) .....:		—
	Measured current (mA) .....:		—
	Max. allowed current (mA) .....:		—
	Cross-sectional area (mm²) of internal protective earthing conductor .....:		—
	Warning label		N

5.3	Electric strength		P
5.3.1	General	All tests voltages were applied for 1 minute 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 table).	P
5.3.2	Test procedure	(see appended table)	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

5.4	Abnormal operating and fault conditions		P
5.4.2	Motors	See annex B.	P
5.4.3	Transformers	Result of the transformers secondary windings short-circuit tests, see 5.4.6 appended table.	P
5.4.4	Compliance of operational insulation		P
	Method used .....:	Short circuit tests. Results see 5.4.6 appended table.	P
5.4.5	Electromechanical components in secondary circuits	No electromechanical components.	N
5.4.6	Other components and circuits	Results see appended table.	P
5.4.7	Test in any expected condition and foreseeable misuse	Output overload test: The most unfavourable load test. Results see appended table. DC fan disable test: Result see appended table. After test the electric strength test was conducted. No isolation break down was noted.	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. Electric strength test primary → SELV and primary → PE were passed.	P
5.4.10	Ball-pressure test of thermoplastic parts; impression shall not exceed 2 mm	Phenolic bobbin material is used in T1, T2, T3 and T4, which is accepted without test. Others see appended table.	P

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
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
	Insulation (mm) between TNV circuit supplied conductively from secondary circuit and hazardous voltage 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

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

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
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 equipment users from voltages on the telecommunication networks		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

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Clause	Requirement – Test	Result – Remark	Verdict
6.4.2.3	Compliance criteria		N
6.5	Protection of telecommunication wiring system from overheating		N
	Maximum continuous output current (A) .....:		N
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 .....:		—

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Clause	Requirement – Test	Result – Remark	Verdict
	Additional information .....:		—

B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS		P
B.1	General requirements	See below	P
	Position .....:	DC fan at secondary.	—
	Manufacturer .....:	See appended table 1.5.1.	—
	Type .....:	See appended table 1.5.1.	—
	Rated voltage (V) or current (A) .....:	12Vd.c.	—
B.2	Test conditions	Evaluated during the corresponding component approval according to IEC 60950.	P
B.3	Maximum temperatures	See sub-clause B.2.	P
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		P
B.7.2	Test time (h) .....:	See sub-clause B.2.	P
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		P
	Position .....:	1.) T2 2.) T3 3.) T4	—
	Manufacturer .....:	See appended table 1.5.1.	—

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
	Type ..... :	See appended table 1.5.1.	—
	Rated values ..... :	See appended table 1.5.1.	—
	Temperatures	(see appended table 5.4)	P
	Thermal cut-out	No thermal cut-out.	N
C.1	Overload test	(see 5.4.3)	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions ..... :	(see transformer construction check)	P
	Retaining of end turns of all windings	Dto	P
	Earthing test at 25 A		N
C.3	Electric strength test	(see 5.3)	P

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 PLAYER INSULATION		N
			N

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

C.2	Safety isolation transformer		P
	Construction details:		
Transformer T2			
Mfr.: Xepex			
Type : 19.21039.003			
All sources are identical except for manufacturer.			
Recurring peak voltage		<420V 0-p	
Required clearance for reinforced			
insulation (from table 3 and 4)		4.0mm	
Effective voltage rms		<250V	
Required creepage distance for reinforced			
insulation (from table 6)		5.0mm	
Measured min. creepage distance			
Location		inside (mm)	outside (mm)
prim-sec		6.0	6.0
prim-core		3.0	3.0
sec-core		3.0	3.0
prim-prim		%	%
Measured min. clearances			
Location		inside (mm)	outside (mm)
prim-sec		6.0	6.0
prim-core		3.0	3.0
sec-core		3.0	3.0
prim-prim		%	%
Construction:			
Concentric windings on ERL-39 type bobbin, three layers insulation between primary and secondary windings. Distance tape is 3.0mm on top and 6.0mm on bottom side of transformer. Winding ends additionally fixed with tape, outer winding is primary. Tubing on exit of all windings.			

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Clause	Requirement – Test	Result – Remark	Verdict

Pin numbers	
Prim.	4/5 – 3 – 6/7 shielding E1, E2connect to pin 1/2
Sec.	13 – 10/11– CT – 8/9 – 12
Bobbin	
Material	Chang Chun Plastic, phenolic type T375J, V-0
Thickness	min. 0.8mm
Electric strength test	
With AC 3000V after humidity treatment	
Result	pass

C.2	Safety isolation transformer		P
	Construction details:		
Transformer T3			
Mfr.: Xepex			
Type : 19.61004.005			
Recurring peak voltage		<424V 0-p	
Required clearance for reinforced			
insulation (from table 3 and 4)		4.0mm + 0.2mm	
Effective voltage rms		<250V	
Required creepage distance for reinforced			
insulation (from table 6)		5.0mm	
Measured min. creepage distance			
Location		inside (mm)	outside (mm)
prim-sec		6.0	6.0
prim-core		3.0	3.0
sec-core		3.0	3.0

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

prim-prim	%	%
Measured min. clearances		
Location	Inside (mm)	outside (mm)
prim-sec	6.0	6.0
prim-core	3.0	3.0
sec-core	3.0	3.0
prim-prim	%	%
Construction:		
Concentric windings on EEL-16 type bobbin, three layers insulation between primary and secondary windings. Distance tape is 3.0mm on top side and 6.0mm on bottom side of transformer. Winding ends additionally fixed with tape, outer winding is primary. Tubing on exit of all windings.		
Pin numbers		
Prim.	2 – 4 – 3	
Sec.	6 – 8 – 5, 10 – 9	
Bobbin		
Material	Chang Chun Plastic, phenolic type T375J, V-0	
Thickness	min. 0.8mm	
Electric strength test		
With AC 3000V after humidity treatment		
Result	pass	

C.2	Safety isolation transformer		P
	Construction details:		
Transformer T4			
Mfr.: Xepex			
Type : 1) 19.61004.006; 2) 19.61019.13			
All sources are identical except for type designation and primary winding turns.			
Recurring peak voltage	612V 0-p		
Required clearance for reinforced			

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insulation (from table 3 and 4)	4.0mm + 0.6mm	
Effective voltage rms	<266V	
Required creepage distance for reinforced		
insulation (from table 6 with condition 7)	5.4mm	
Measured min. creepages		
Location	Inside (mm)	outside (mm)
prim-sec	6.0	6.0
prim-core	3.0	3.0
sec-core	3.0	3.0
prim-prim	%	%
Measured min. clearances		
Location	inside (mm)	outside (mm)
prim-sec	6.0	6.0
prim-core	3.0	3.0
sec-core	3.0	3.0
prim-prim	%	%
Construction:		
Concentric windings on EEL-16 type bobbin, three layers insulation between primary and secondary windings. Distance tape is 3.0mm on top and bottom sides of transformer. Winding ends additionally fixed with tape, outer winding is primary. Tubing on exit of all windings.		
Pin numbers		
Prim.	1) 9 – 7, 6 – 5, shielding E1connect to pin 7 (for model HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-420-10z DF) 2) 9 – 7, 6 – 5, F1 – F2, shielding E1connect to pin 7 (for model HPC-360-30z, HPC-360-30z DF, HPC-420-30z DF)	
Sec.	4 – 2 – 1	
Bobbin		

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Material	Chang Chun Plastic, phenolic type T375J, V-0
Thickness	min. 0.8mm
Electric strength test	
With AC 3000V after humidity treatment	
Result	pass

1.5.1	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Chassis	--	--	Sheeted metal, min. 0.8mm	--	--
PCB	--	--	V-1 or better, min. 105°C	UL 94	UL
EMI filter	Yunpen	YB10A3	10A, 250V (CX=0.1μF, CY=3300pFx2)	IEC 60320-1	VDE, S, UL, CSA
	High & Low	10SS1	10A, 250V (CX=0.1μF, CY=2200pFx2)	IEC 60320-1	VDE, S, UL, CSA
	Delta	10GEEG3E	10A, 250V (CX=0.1μF, CY=2200pFx2)	IEC 60320-1	VDE, S, UL, CSA
Inlet	Rong Feng	SS-120, SS-7B	10A, 250V	IEC 60320-1	VDE
	Inalways	0711	10A, 250V	IEC 60320-1	VDE
	Solteam	ST-01	10A, 250V	IEC 60320-1	VDE
	Zhang Jiagang Hua Feng	HF-301	10A, 250V	IEC 60320-1	VDE
Voltage select switch (Optional)	Legion	VS34	10A (1), 250V	IEC 60158-1	VDE, S, UL, CSA
	Legion	VS12	12A (1), 250V	IEC 60158-1	VDE, S, UL, CSA
	Solteam	EV-12, EV-12A	10A (1), 250V	IEC 60158-1	VDE, S, UL, CSA

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Rocker switch (Optional)	Zhang Jia Gang Hua Feng	HF-606	10A, 250V	IEC 60158-1	VDE, S, UL, CSA
	Solteam	OR-2	10A, 250V	IEC 60158-1	VDE, S, UL, CSA
	Legion	SS24	16 (4), 250V	IEC 60158-1	VDE, S, UL, CSA
DC fan	Adda	AD0812HS-A70GL	12V, 0.24A, 39.2CFM	IEC60950	UL, TÜV
	Adda	AD0812HB-A70GL	12V, 0.25A, 38.6CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012MB MGA8012MS	12V, 0.15A, 32.11CFM	IEC60950	UL, CSA, TÜV
	Protechnic	MGA8012HB MGA8012HS	12V, 0.24A, 38.28CFM	IEC60950	UL, CSA, TÜV
	Protechnic	MGA8012HB-A20 MGA8012HS-A20 MGA8012HC-A20	12V, 0.25A, 35.64CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012XB-A20 MGA8012XS-A20	12V, 0.34A, 40.97CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012YB-A20 MGA8012YS-A20	12V, 0.44A, 47.1CFM	IEC60950	UL, TÜV
	Yate Loon	D80SH-12	12V, 0.19A, 38CFM	IEC60950	UL, TÜV
	Yate Loon	D80BH-12	12V, 0.19A, 37.8CFM	IEC60950	UL, TÜV
	Cheng Home	CHA8012BS CHA8012BB CHA8012BBS	12V, 0.12A, 30.36CFM	IEC60950	UL, CSA, TÜV
	Cheng Home	CHA8012CS CHA8012CB CHA8012CBS	12V, 0.17A, 37.07CFM	IEC60950	UL, CSA, TÜV
	Cheng Home	CHA8012DS CHA8012DB	12V, 0.30A, 44.13CFM	IEC60950	UL, CSA, TÜV
	Everflow	F128025BL	12V, 0.10A, 32.4CFM	IEC60950	UL, TÜV
	Everflow	F128025SM F128025BM F128025DM	12V, 0.14A, 38.4CFM	IEC60950	UL, TÜV

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-Located on top of chassis (for HPC-360-10z DF, HPC-360-30z DF, HPC-420-10z DF HPC-420-30z DF)	Cheng Home	CHA8012CS-M CHA8012CB-M CHA8012CBS-M	12V, 0.17A, 30.23CFM	IEC60950	UL, TÜV
	Cheng Home	CHA8012BS-M CHA8012BB-M CHA8012BBS-M	12V, 0.12A, 25.23CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012MB-A15 MGA8012MS-A15 MGA8012MC-A15	12V, 0.13A, 25.32CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012HB-A15 MGA8012HS-A15 MGA8012HC-A15	12V, 0.18A, 28.29CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012XB-A15 MGA8012XS-A15 MGA8012XC-A15	12V, 0.20A, 32.21CFM	IEC60950	UL, TÜV
	Protechnic	MGA8012ZB-A15 MGA8012ZS-A15 MGA8012ZC-A15	12V, 0.29A, 38.00CFM	IEC60950	UL, TÜV
Bleeder resistor (RX0)	--	Carbon film type	560KΩ 1/2W	--	--
X-Cap (CX0, CX1 & CX2) (Optional)	Phillps	3351, 33591, PCX2335	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	Jenn Fu	MPX	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	UTX	HQX	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	Dain	MPX	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	Siemens	B81133	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	Teapo	XG-VS, VG-VS	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	Pilkor	PCX2 335M	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL
	Shiny Space	SX1	min. 250V, max. 0.47μF	IEC 60384-14/1993	VDE, SEV, S, FI, UL

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	Tenta	MEX	min. 250V, max. 0.47µF	IEC 60384-14	VDE, SEV, S, FI, UL
	Hsuan Tai	MCY	min. 250V, max. 0.47µF	IEC 60384-14	VDE, SEV, S, FI, UL
	Cheng Tung	CTX	min. 250V, max. 0.47µF	IEC 60384-14	VDE, SEV, S, FI, UL
	Chiefcon	CKX	min. 250V, max. 0.47µF	IEC 60384-14	VDE, SEV, S, FI, UL
	SSE	SX1	min. 250V, max. 0.47µF	IEC 60384-14	VDE, SEV, S, FI, UL
Fuse (F1)	Bel	5STP, 5HTP	T8A, 250V	--	UL
	Littelfuse	221, 228	T8A, 250V	--	UL
	Conquer	UTE-A, UDA-A	T8A, 250V	--	UL
-For Model HPC-420-10z DF	Bel	5STP, 5HTP	T10A, 250V	--	UL
	Littelfuse	221, 228	T10A, 250V	--	UL
	Conquer	UTE-A, UDA-A	T10A, 250V	--	UL
Y-Cap (CY1, CY2, CY3)	Matsushita	NS-A	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
(Optional)	Murata	JC, KH, KX	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
	Samsung	AA, AD	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
	Success	SF, SE	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
	JYA-NAY	JY, JN	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
	TDK	CS, CD	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
	Welson	KL, WD	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
	Pan Overseas	AC, AH	min. 250V, max. 4700pF	IEC60384-14/ 1993	VDE, S, UL, CSA
Varistors (VZ1, VZ2)	Walsin	VZ07D271KBS	175Vac, 225Vdc	--	UL
	Uppermost	V07K175	175Vac, 225Vdc	--	UL

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Clause	Requirement – Test	Result – Remark	Verdict

	Thinking	TVR07271	175Vac, 225Vdc	--	UL
	SAS	SAS-271KD07	175Vac, 225Vdc	--	UL
	Success	SVR-07D271K	175Vac, 225Vdc	--	UL
	Ceramate	GNR07D271K	175Vac, 225Vdc	--	UL
Varistor (VZ3) (Optional)	Walsin	VZ07D471KBS	300Vac	--	UL
	Uppermost	V07K300	300Vac	--	UL
	Thinking	TVR07471	300Vac	--	UL
	SAS	SAS-471KD07	300Vac	--	UL
	Success	SVR-07D471K	300Vac	--	UL
	Ceramate	GNR07D471K	300Vac	--	UL
Storage capacitors (C3, C4)	--	Electrolytic can type	680~1000μF, min. 200V, 85° C, min.	--	--
Photo coupler (U4)	Lite-On Electronics	LTV817 LTV817M LTV817S	di = 0.8 mm	VDE0884 IEC60950	VDE, FI
	NEC corporation	PS2561-1 PS2561-2 PS2561-3 PS2561-4	di > 0.4 mm	VDE0884 IEC60950	VDE, FI
	NEC corporation	PS2561L-1 PS2561L-2 PS2561L-3 PS2561L-4	di > 0.4 mm	VDE0884 IEC60950	VDE, FI
	NEC corporation	PS2581 Series	di = 0.6 mm	VDE0884 IEC60950	VDE, FI
	Toshiba	TLP721 TLP721F	di = 0.8 mm	VDE0884 IEC60950	VDE, FI
	Toshiba	TLP621 TLP621-2 TLP621-3 TLP621-4	di = 0.8 mm	VDE0884 IEC60950	VDE, FI

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	Quality Technologies	H11A817A H11A817B H11A817C	di > 1.0 mm	VDE0884 IEC60950	VDE, FI
	Sharp	PC 817	di > 0.4 mm	VDE0884 IEC60950	VDE, FI
	Vishay	TCET1100 TCET1101 TCET1102 TCET1103 TCET1104 TCET1105 TCET1106 TCET1107 TCET1108 TCET1109	di = 0.6 mm	VDE0884 IEC60950	VDE, FI
Thermistor (TR1) (Optional)	--	--	Min. 8A, 2.5Ω at 25°C	--	--
Bridge diode (D1)	--	--	Min. 8A, min 600V	--	--
Switching Transistors (Q3, Q4)	--	2SC3320 or equivalent	15A, 400V	--	--
Line filter (T0) (Optional)	Xepex	19.45001.009	115°C	--	--
Line filter (T1) (Optional)	Xepex	19.45042.015	130°C	--	--
	Xepex	19.61025.001	130°C	--	--
Transformer (T2)	Xepex	19.21039.003	Isolation class E	Applicable parts in IEC 60950 and acc. to IEC60085	Accpted by TÜV Rheinland
Transformer (T3)	Xepex	19.61004.005	Isolation class E	Applicable parts in IEC 60950 and acc. to IEC60085	Accpted by TÜV Rheinland
Transformer (T4)	Xepex	19.61004.006	Isolation class E	Applicable parts in IEC 60950 and acc. to IEC60085	Accpted by TÜV Rheinland
(for HPC-360-30z , HPC-360-30z DF, HPC-420-30z DF)	Xepex	19.61019.013	Isolation class E	Applicable parts in IEC 60950 and acc. to IEC60085	Accpted by TÜV Rheinland

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PFC Choke (L1) (for HPC-360-30z , HPC-360-30z DF, HPC-420-30z DF)	Xepex	19.40001.005 19.40001.006 19.40001.008 19.40001.009	130°C	--	--
PFC Choke (PFC) (For model HPC-360-20z)	Whole-Yik, Szfong	19.21022.010 19.21022.011	Isolation class A	--	--
Choke (L4)	Xepex	19.40039.029	130°C	--	--
Mylar sheet	--	--	V-2 or better, thickness min. 0.25mm	UL94	UL
[1]) an asterisk indicates a mark which assures the agreed level of surveillance					

1.6	TABLE: electrical data (in normal conditions)					P
fuse #	Irated (A)	U (V)	P (W)	I (A)	Ifuse (A)	condition/status
Model: HPC-360-10z						
F1	--	103.5/ 50Hz	495	6.98	6.98	condition A
F1	--	103.5/ 60Hz	494	6.77	6.77	dto
F1	8	115/ 50Hz	491	6.33	6.33	dto
F1	8	115/ 60Hz	481	6.61	6.61	dto
F1	5	230/ 50Hz	466	3.57	3.57	dto
F1	5	230/ 60Hz	463	3.47	3.47	dto
F1	--	253/ 50Hz	467	3.31	3.31	dto
F1	--	253/ 60Hz	467	3.22	3.22	dto
F1	--	103.5/ 50Hz	506	7.13	7.13	condition B
F1	--	103.5/ 60Hz	505	6.90	6.90	dto
F1	8	115/ 50Hz	500	6.45	6.45	dto
F1	8	115/ 60Hz	499	6.27	6.27	dto
F1	5	230/ 50Hz	478	3.64	3.64	dto
F1	5	230/ 60Hz	475	3.54	3.54	dto
F1	--	253/ 50Hz	479	3.38	3.38	dto

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Clause	Requirement – Test	Result – Remark	Verdict

F1	--	253/ 60Hz	478	3.29	3.29	dto
F1	--	103.5/ 50Hz	520	7.31	7.31	condition C
F1	--	103.5/ 60Hz	518	7.08	7.08	dto
F1	8	115/ 50Hz	515	6.61	6.61	dto
F1	8	115/ 60Hz	514	6.44	6.44	dto
F1	5	230/ 50Hz	490	3.73	3.73	dto
F1	5	230/ 60Hz	490	3.62	3.62	dto
F1	--	253/ 50Hz	493	3.47	3.47	dto
F1	--	253/ 60Hz	490	3.37	3.37	dto
Model: HPC-360-20z						
F1	--	103.5/ 50Hz	488	6.88	6.88	condition A
F1	--	103.5/ 60Hz	487	6.67	6.67	dto
F1	8	115/ 50Hz	484	6.24	6.24	dto
F1	8	115/ 60Hz	483	6.06	6.06	dto
F1	5	230/ 50Hz	466	2.89	2.89	dto
F1	5	230/ 60Hz	468	2.85	2.85	dto
F1	--	253/ 50Hz	465	2.62	2.62	dto
F1	--	253/ 60Hz	465	2.58	2.58	dto
F1	--	103.5/ 50Hz	497	6.99	6.99	condition B
F1	--	103.5/ 60Hz	496	6.78	6.78	dto
F1	8	115/ 50Hz	493	6.33	6.33	dto
F1	8	115/ 60Hz	492	6.16	6.16	dto
F1	5	230/ 50Hz	495	2.95	2.95	dto
F1	5	230/ 60Hz	477	2.90	2.90	dto
F1	--	253/ 50Hz	477	2.67	2.67	dto
F1	--	253/ 60Hz	475	2.63	2.63	dto
F1	--	103.5/ 50Hz	510	7.19	7.19	condition C

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Clause	Requirement – Test	Result – Remark	Verdict

F1	--	103.5/ 60Hz	509	6.94	6.94	dto
F1	8	115/ 50Hz	506	6.49	6.49	dto
F1	8	115/ 60Hz	505	6.32	6.32	dto
F1	5	230/ 50Hz	490	3.04	3.04	dto
F1	5	230/ 60Hz	490	3.00	3.00	dto
F1	--	253/ 50Hz	490	2.75	2.75	dto
F1	--	253/ 60Hz	490	2.70	2.70	dto
Model: HPC-360-30z						
F1	--	90/ 50Hz	542	6.01	6.01	condition A
F1	--	90/ 60Hz	542	6.00	6.00	dto
F1	8	100/ 50Hz	532	5.26	5.26	dto
F1	8	100/ 60Hz	532	5.26	5.26	dto
F1	--	180/ 50Hz	499	2.871	2.871	dto
F1	--	180/ 60Hz	499	2.81	2.81	dto
F1	8	200/ 50Hz	507	2.52	2.52	dto
F1	8	200/ 60Hz	507	2.53	2.53	dto
F1	8	240/ 50Hz	504	2.10	2.10	dto
F1	8	240/ 60Hz	504	2.11	2.11	dto
F1	--	264/ 50Hz	502	1.91	1.91	dto
F1	--	264/ 60Hz	502	1.92	1.92	dto
F1	--	90/ 50Hz	554	6.13	6.13	condition B
F1	--	90/ 60Hz	554	6.13	6.13	dto
F1	8	100/ 50Hz	544	5.38	5.38	dto
F1	8	100/ 60Hz	554	5.39	5.39	dto
F1	--	180/ 50Hz	510	2.87	2.87	dto
F1	--	180/ 60Hz	510	2.87	2.87	dto
F1	8	200/ 50Hz	519	2.58	2.58	dto
F1	8	200/ 60Hz	519	2.58	2.58	dto
F1	8	240/ 50Hz	513	2.14	2.14	dto
F1	8	240/ 60Hz	513	2.14	2.14	dto
F1	--	264/ 50Hz	513	1.96	1.96	dto

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

F1	--	264/ 60Hz	513	1.96	1.96	dto
F1	--	90/ 50Hz	569	6.30	6.30	condition C
F1	--	90/ 60Hz	569	6.30	6.30	dto
F1	8	100/ 50Hz	558	5.53	5.53	dto
F1	8	100/ 60Hz	558	5.53	5.53	dto
F1	--	180/ 50Hz	524	2.94	2.94	dto
F1	--	180/ 60Hz	524	2.95	2.95	dto
F1	8	200/ 50Hz	533	2.65	2.65	dto
F1	8	200/ 60Hz	531	2.65	2.65	dto
F1	8	240/ 50Hz	525	2.20	2.20	dto
F1	8	240/ 60Hz	526	2.20	2.20	dto
F1	--	264/ 50Hz	526	2.01	2.01	dto
F1	--	264/ 60Hz	526	2.01	2.01	dto
Model: HPC-420-10z DF						
F1	--	103.5/ 50Hz	602	8.04	8.04	condition A
F1	--	103.5/ 60Hz	600	7.77	7.77	dto
F1	10	115/ 50Hz	597	7.27	7.27	dto
F1	10	115/ 60Hz	595	7.08	7.08	dto
F1	5	230/ 50Hz	594	4.07	4.07	dto
F1	5	230/ 60Hz	593	3.96	3.96	dto
F1	--	253/ 50Hz	596	3.78	3.78	dto
F1	--	253/ 60Hz	593	3.68	3.68	dto
F1	--	103.5/ 50Hz	623	8.31	8.31	condition B
F1	--	103.5/ 60Hz	621	8.02	8.02	dto
F1	10	115/ 50Hz	618	7.51	7.51	dto
F1	10	115/ 60Hz	617	7.32	7.32	dto
F1	5	230/ 50Hz	613	4.20	4.20	dto
F1	5	230/ 60Hz	613	4.09	4.09	dto
F1	--	253/ 50Hz	613	3.90	3.90	dto

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Clause	Requirement – Test	Result – Remark	Verdict

F1	--	253/ 60Hz	614	3.80	3.80	dto
F1	--	103.5/ 50Hz	630	8.40	8.40	condition C
F1	--	103.5/ 60Hz	627	8.10	8.10	dto
F1	10	115/ 50Hz	625	7.60	7.60	dto
F1	10	115/ 60Hz	624	7.38	7.38	dto
F1	5	230/ 50Hz	622	4.25	4.25	dto
F1	5	230/ 60Hz	620	4.13	4.13	dto
F1	--	253/ 50Hz	622	3.93	3.93	dto
F1	--	253/ 60Hz	624	3.83	3.83	dto
Model: HPC-420-30z DF						
F1	--	90/ 50Hz	647	7.50	7.50	condition A
F1	--	90/ 60Hz	646	7.50	7.50	dto
F1	8	100/ 50Hz	634	6.55	6.55	dto
F1	8	100/ 60Hz	634	6.55	6.55	dto
F1	--	180/ 50Hz	586	3.41	3.41	dto
F1	--	180/ 60Hz	593	3.41	3.41	dto
F1	8	200/ 50Hz	587	2.99	2.99	dto
F1	8	200/ 60Hz	587	3.01	3.01	dto
F1	8	240/ 50Hz	581	2.49	2.49	dto
F1	8	240/ 60Hz	582	2.51	2.51	dto
F1	--	264/ 50Hz	580	2.28	2.28	dto
F1	--	264/ 60Hz	580	2.30	2.30	dto
F1	--	90/ 50Hz	669	7.80	7.80	condition B
F1	--	90/ 60Hz	672	7.81	7.81	dto
F1	8	100/ 50Hz	655	6.83	6.83	dto
F1	8	100/ 60Hz	659	6.84	6.84	dto
F1	--	180/ 50Hz	614	3.53	3.53	dto
F1	--	180/ 60Hz	611	3.53	3.53	dto
F1	8	200/ 50Hz	608	3.10	3.10	dto
F1	8	200/ 60Hz	616	3.15	3.15	dto

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

F1	8	240/ 50Hz	602	2.58	2.58	dto
F1	8	240/ 60Hz	604	2.60	2.60	dto
F1	--	264/ 50Hz	600	2.36	2.36	dto
F1	--	264/ 60Hz	601	2.38	2.38	dto
F1	--	90/ 50Hz	682	7.89	7.89	condition C
F1	--	90/ 60Hz	682	7.90	7.90	dto
F1	8	100/ 50Hz	664	6.91	6.91	dto
F1	8	100/ 60Hz	661	6.91	6.91	dto
F1	--	180/ 50Hz	616	3.56	3.56	dto
F1	--	180/ 60Hz	613	3.56	3.56	dto
F1	8	200/ 50Hz	615	3.14	3.14	dto
F1	8	200/ 60Hz	616	3.15	3.15	dto
F1	8	240/ 50Hz	609	2.61	2.61	dto
F1	8	240/ 60Hz	609	2.62	2.62	dto
F1	--	264/ 50Hz	606	2.38	2.38	dto
F1	--	264/ 60Hz	607	2.40	2.40	dto

Model: HPC-360-10z/ Model: HPC-360-20z/ Model: HPC-360-30z

Condition A: +5V/ 35A, +12V/ 10A, +3.3V/ 13.64A, +5VSB/ 2A, -5V/ 0.3A, -12V/ 0.8A

Condition B: +5V/ 8.72A, +12V/ 17A, +3.3V/ 28A, +5VSB/ 2A, -5V/ 0.3A, -12V/ 0.8A

Condition C: +5V/ 25.52A, +12V/ 10A, +3.3V/ 28A, +5VSB/ 2A, -5V/ 0.3A, -12V/ 0.8A

Model: HPC-420-10z DF/ Model: HPC-420-30z DF

Condition A: +5V/ 40A, +12V/ 15A, +3.3V/ 6.06A, +5VSB/ 2A, -5V/ 0.3A, -12V/ 0.8A

Condition B: +5V/ 17A, +12V/ 18A, +3.3V/ 30A, +5VSB/ 2A, -5V/ 0.3A, -12V/ 0.8A

Condition C: +5V/ 24.2A, +12V/ 15A, +3.3V/ 30A, +5VSB/ 2A, -5V/ 0.3A, -12V/ 0.8A

2.1.5	TABLE: max. V, A, VA test			P
Voltage (Rated) (V)	Current (Rated) (A)	Voltage (Max) (V)	Current (Max.) (A)	VA (Max.) (VA)
Model: HPC-420-30z				
+5	40	5.75	43	197.8

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Clause	Requirement – Test	Result – Remark	Verdict

+12	18	14.24	20	232.4
+3.3	30	3.4	42	121.8
+5VSB	2	5.15	3	15.03
-5	0.3	-5.01	1.5	7.365
-12	0.8	-14.14	5.6	57.68
Model: HPC-360-30z				
+5	35	5.64	41	195.16
+12	17	13.64	20	220
+3.3	28	3.4	37	108.41
+5VSB	2	5.13	3	14.82
-5	0.3	-5.02	1.5	6.9
-12	0.8	-13.37	8	85.6

2.1.10	TABLE: discharge test			P
Condition	τ calculated (s)	τ measured (s)	t u→ 0V (s)	comments
System on	0.846	0.4	<1	fuse in
Overall capacity:	1.51μF(CX0=CX1=CX2=0.47μF; EMI filter=0.1μF)			
Discharge resistor:	560kΩ (RX0=560kΩ)			

2.2.7	Table: working voltage measurement			P
Location		RMS Voltage (V)	Peak Voltage (V)	Comments[1])
Model: HPC-420-10z DF				
T2	pin 1, 2 – 8, 9	211	360	
	pin 4, 5 – 8, 9	142	204	
	pin 6, 7 – 8, 9	175	360	
	pin 1, 2 – 10, 11	210	360	
	pin 4, 5 – 10, 11	141	200	

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Clause	Requirement – Test	Result – Remark	Verdict

	pin 6, 7 – 10, 11	185	360	
	pin 1, 2 – 12	**212**	380	*
	pin 4, 5 – 12	143	224	
	pin 6, 7 – 12	168	356	
	pin 1, 2 – 13	211	376	
	pin 4, 5 – 13	142	220	
	pin 6, 7 – 13	192	**384**	*
	pin 1, 2 – CT (Earth)	211	348	
	pin 4, 5 – CT (Earth)	141	200	
	pin 6, 7 – CT (Earth)	180	352	
T3	pin 5 – 2	170	368	
	pin 6 – 2	174	372	
	pin 8 – 2	171	364	
	pin 9 – 2	**223**	424	*
	pin 10 – 2	222	420	
	pin 5 – 3	193	416	
	pin 6 – 3	198	**424**	*
	pin 8 – 3	194	416	
	pin 9 – 3	222	404	
	pin 10 – 3	222	412	
	pin 5 – 4	180	380	
	pin 6 – 4	185	392	
	pin 8 – 4	181	380	
	pin 9 – 4	221	392	
	pin 10 – 4	221	384	
T4	pin 5 – 1	190	344	
	pin 6 – 1	198	368	
	pin 7 – 1	250	580	
	pin 9 – 1	218	420	
	pin 5 – 2	188	328	
	pin 6 – 2	192	352	
	pin 7 – 2	257	600	

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Clause	Requirement – Test	Result – Remark	Verdict

	pin 9 – 2	216	380	
	pin 5 – 4 (Earth)	188	320	
	pin 6 – 4 (Earth)	190	348	
	pin 7 – 4 (Earth)	**264**	**612**	*
	pin 9 – 4 (Earth)	215	356	
Model: HPC-420-30z DF				
T2	pin 1, 2 – 8, 9	213	360	
	pin 4, 5 – 8, 9	140	208	
	pin 6, 7 – 8, 9	173	356	
	pin 1, 2 – 10, 11	210	364	
	pin 4, 5 – 10, 11	140	200	
	pin 6, 7 – 10, 11	183	360	
	pin 1, 2 – 12	210	**388**	*
	pin 4, 5 – 12	140	228	
	pin 6, 7 – 12	167	356	
	pin 1, 2 – 13	210	380	
	pin 4, 5 – 13	140	220	
	pin 6, 7 – 13	191	380	
	pin 1, 2 – CT (Earth)	212	349	
	pin 4, 5 – CT (Earth)	142	203	
	pin 6, 7 – CT (Earth)	183	352	
T3	pin 5 – 2	168	360	
	pin 6 – 2	172	356	
	pin 8 – 2	168	360	
	pin 9 – 2	222	424	
	pin 10 – 2	222	412	
	pin 5 – 3	192	412	
	pin 6 – 3	197	424	
	pin 8 – 3	193	416	
	pin 9 – 3	221	408	
	pin 10 – 3	221	420	
	pin 5 – 4	179	380	

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

	pin 6 – 4	184	395	
	pin 8 – 4	180	384	
	pin 9 – 4	220	388	
	pin 10 – 4	220	388	
T4	pin 5 – 1	192	340	
	pin 6 – 1	198	364	
	pin 7 – 1	248	552	
	pin 9 – 1	218	428	
	pin 5 – 2	191	332	
	pin 6 – 2	193	356	
	pin 7 – 2	260	568	
	pin 9 – 2	218	388	
	pin 5 – 4	190	328	
	pin 6 – 4	182	352	
	pin 7 – 4	**266**	**580**	*
	pin 9 – 4	217	364	

Input voltage: 240V, 60 Hz

[1]) an asterisk indicates the highest measured working voltage.

2.3.2	TABLE: Hazardous voltage measurement			P
Transformer	Location	Max. Voltage		Voltage Limitation
		Peak	DC	Components
Model: HPC-420-30z DF				
T2	Pin 8, 9 – CT (Earth)	23	--	--
T2	Pin 10, 11 – CT (Earth)	20	--	--
	Pin 12 – CT (Earth)	52	--	--
		52	--	D17
		23	--	L6
	Pin 13 – CT (Earth)	47	--	--
		17	--	L6

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

T4	Pin 2 – 4 (Earth)	30	--	--

2.3.2	TABLE: SEL voltage measurement	
Location	Voltage measured (V)	Comments
+12V	0	L6 shorted
-12V	0	L6 shorted

Note:

1. The working voltage of the other transformer secondary windings did not exceed the limiting values during normal and single-fault condition.

2.5.11	TABLE: ground continue test	P
Location	Resistant measured (Ω)	Comments
Grounding pin to Chassis	0.007	Test current = 25A, 60 sec
Grounding pin to Chassis	0.0072	Test current = 30A, 120 sec
Test current = 25A, 30A		

2.9.2 and 2.9.3	TABLE: clearance and creepage distance measurements					P
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)
For model: HPC-360-10z						
Unit: primary components (with 10N) → metal chassis (PE)	<420	<250	2.0	2.5	2.5	2.5
Unit: primary components (with 10N) → secondary components (with 10N)	<420	<250	4.0	5.0	5.0	5.0
PCB: primary trace → PE trace	<420	<250	2.0	2.5	2.5	2.5

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Clause	Requirement – Test	Result – Remark	Verdict

PCB: CY2	primary trace → PE trace under CY1, and CY3	<420	<250	2.0	3.5	2.5	3.5
PCB:	primary traces → secondary traces under T2	<420	<250	4.0	8.5	5.0	8.5
PCB:	primary traces → secondary traces under T3	<424	<250	4.2	7.5	5.0	7.5
PCB:	primary traces → secondary traces under T4	612	266	4.6	7.5	5.4	7.5
PCB:	primary traces → secondary traces under T501	559	264	4.6	7.6	5.4	7.6
PCB:	primary traces → secondary traces under U4	<420	<250	4.0	7.4	5.0	7.4
PCB:	primary traces → secondary traces (others)	<420	<250	4.0	5.0	5.0	5.0
Primary trace → earted trace others		<420	<250	2.0	2.5	2.5	2.5
For model: HPC-360-20z							
Unit:	primary components (with 10N) → PFC choke core (floating)	<420	<250	2.0	2.5	2.5	2.5
PCB:	primary trace → PFC choke core (floating)	<420	<250	2.0	2.5	2.5	2.5

Note:

1) Operational insulation shorted, see 5.4.4.
2) One transparent mylar sheets had been placed between PCB and metal enclosure to keep basic isolation to the earthed chassis.
3) Secondary wire package has been combined by a cable tie.
4) DC Fan wires with PVC tubing 0.4mm thickness and fixed by cable ties in the end of tubing.
5) Tubed components (safety relevant): CX0, T0, F1, VZ1, VZ2, C5, L-N wires and select switch wires.
6) Glued components (safety relevant): CX0, F1, TR1, CY2, CX2

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Clause	Requirement – Test	Result – Remark	Verdict

2.9.4.1	TABLE: distance through insulation measurements				P
distance through insulation di at/of:		U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)
photo coupler (reinforced insulation)		250	3000	0.4	approved comp.
For distance through insulation, see appended table 1.5.1 for details.					

4.3.15/16 & 4.4.6	Table: enclosure openings	N
Location	Size (mm)	Comments

5.1	TABLE: temperature rise measurements			P
	test voltage (V) ..... :	a) 100-10% b) 240 + 10% c) 103.5 d) 253 e) 207		—
	t1 (°C) ..... :			—
	t2 (°C) ..... :			—
temperature rise dT of part/at:		dT (K)		required dT (K)
Model: HPC-420-30z DF				
Test voltage		a	b	--
T4 coil		31.2	29.9	80
T4 core		24.8	23.1	80

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Clause	Requirement – Test	Result – Remark	Verdict

T3 coil	22.6	22.5	80
T3 core	19.5	18.7	80
T2 coil	42.3	40.4	80
T2 core	23.4	22.1	80
PFC Choke (19.40001.005)	45.0	17.1	65
D1	87.8	35.2	--
C3	19.2	12.4	60
T1	38.0	13.1	105
HS1 near PCB	34.8	20.3	80
PCB under TR1	44.4	27.7	80
HS2 near PCB	32.8	32.0	80
L4	65.6	62.8	105
L6	27.5	26.3	80
U1	10.4	9.6	--
Ambient	24.7°C	17.4°C	--
Model: HPC-360-30z DF			
Test voltage	a	b	--
T4 coil	46.3	43.8	80
T4 core	36.1	34.8	80
T3 coil	48.5	45.9	80
T3 core	38.9	35.9	80
T2 coil	27.6	26.9	80
T2 core	21.9	19.5	80
PFC Choke, L1 on PFC board (19.40001.006/ 19.40001.008)	56.9/ 60.6	20.7	105
D1	84.3	31.7	--
C3	6.6	3.4	60
T1	60.3	22.1	105
HS1 near PCB	47.8	24.2	80
PCB under TR1	53.1	36.4	80
HS2 near PCB	69	69.4	80
L4	86.6	72.9	105

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Clause	Requirement – Test	Result – Remark	Verdict

L6	48.9	49.1	80
U1	25.7	28.4	--
C15	40.2	37.4	60
Ambient	28.7°C	28.5°C	--
Model: HPC-420-10z DF (T1: 19.45042.015)			
Test voltage	c	d	--
T4 coil	35.8	26.1	80
T4 core	24.3	20.7	80
T3 coil	26.2	17.8	80
T3 core	19.0	13.6	80
T2 coil	43.9	22.0	80
T2 core	32.7	22.3	80
T0	49.6	13.8	90
T1 (19.45042.015)	45.9	20.1	105
HS1 near PCB	39.7	33.3	80
HS2 near PCB	36.2	24.9	80
L4	90.7	43.9	105
L6	40.2	37.5	80
Ambient	27°C	27.1°C	--
Model: HPC-420-10z DF (T1: 19.45042.015)			
Test voltage	c	--	--
T4 coil	40.7	--	80
T4 core	30.0	--	80
T3 coil	35.8	--	80
T3 core	28.5	--	80
T2 coil	57.5	--	80
T2 core	23.0	--	80
T1 (19.61025.001)	54.4	--	105
D1	24.6	--	80
Ambient	27.1°C	--	--
Model: HPC-360-20z (PFC coil = 19.21022.011)			
Test voltage	c	e	d	--

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Clause	Requirement – Test	Result – Remark	Verdict

T4 coil	49.2	52.3	49.5	80
T4 core	37.9	40.9	38.8	80
T3 coil	46.9	49.2	45.8	80
T3 core	39.9	41.6	38.3	80
T2 coil	29.2	31.0	28.3	80
T2 core	22.8	24.2	23.3	80
PFC coil (19.21022.011)	4.6	38.7	30.3	65
PFC core (19.21022.011)	2.2	36.6	29.0	65
T1 (19.45042.015)	32.5	14.6	15.0	105
L4	70.2	74.4	72.0	105
L6	40.3	40.9	42.1	80
Ambient	27.3°C	25.2°C	24.2°C	--
Model: HPC-360-20z (PFC coil = 19.21022.010)				
Test voltage	c	e	d	--
T4 coil	48.6	56.8	52.9	80
T4 core	42.1	39.7	35.5	80
T3 coil	40.0	48.9	45.2	80
T3 core	34.6	38.6	33.9	80
T2 coil	43.8	37.1	37.1	80
T2 core	38.4	32.4	31.3	80
PFC coil (19.21022.010)	10.3	37.2	29.6	65
PFC core (19.21022.010)	10.6	39.8	34.8	65
T1 (19.61025.001)	48.1	15.9	17	105
L4	84.2	80.4	84.1	105
L6	48.9	46.1	46.7	80
Ambient	27.3°C	26.7°C	24.1°C	--

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	required dT (K)	Insulation class

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

Comments:

The temperatures were measured under worst case normal mode defined in 1.2.2.1 and as described in 1.6.1 at voltages as described in 1.6.5.

With a specified ambient temperature of 25°C, the max. temperature rise is calculated as follows:

Winding components:

- Class A → dTmax = 75K - 10K - (25-25)K = 65K
- Class E → dTmax = 90K - 10K - (25-25)K = 80K

Electrolyte capacitor or components with:

- max. absolute temp. of 85°C → dTmax = (85-25) K = 60K
- max. absolute temp. of 105°C → dTmax = (105-25) K = 80K
- max. absolute temp. of 125°C → dTmax = (125-25) K = 100K
- max. absolute temp. of 130°C → dTmax = (130-25) K = 105K

For model with two DC fans used had been tested with, Cheng Home, type CHA8012BS and CHA8012BS-M providing airflow of 30.36CFM and 25.23CFM.

For model with one DC fan used had been tested with, Cheng Home, type CHA8012BS providing airflow of 30.36CFM.

5.2	TABLE: leakage current measurement		P
Condition	current L→PE (mA)	current N→PE (mA)	comments
Model No.: HPC-360-10z			
Fuse in	0.8	0.78	
Fuse Out	1.29	0.27	
Model No.: HPC-360-20z			
Fuse In	1.2	1.07	
Fuse Out	1.9	0.3	
Model No.: HPC-360-30z			
Fuse In	1.2	1.15	
Fuse Out	1.95	0.3	
Model No.: HPC-420-10z DF			
Fuse In	1.0	1.0	
Fuse Out	1.65	0.3	

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Clause	Requirement – Test	Result – Remark	Verdict

Model No.: HPC-420-30Z DF			
Fuse In	1.15	1.15	
Fuse Out	1.9	0.32	
Input voltage:	264V		
Input frequency:	60Hz		
Overall capacity:	CY1 = CY2 = CY3 = 4700pF, EMI filter: YB10A3: 3300pF*2		

5.3	TABLE: electric strength measurements		P
test voltage applied between:		test voltage (V)	breakdown
primary → secondary		DC4242	No
primary → PE trace		DC2718	No
T2 pri → sec		AC3000	No
T2 pri → core		AC1569	No
T2 sec → core		AC1569	No
T3 pri → sec		AC3000	No
T3 pri → core		AC1640	No
T3 sec → core		AC1640	No
T4 pri → sec		AC3000	No
T4 pri → core		AC1922	No
T4 sec → core		AC1922	No
Two layers of insulation tape between transformer T2, T3, T4		AC3000	No

5.4	TABLE: fault condition tests		P
	ambient temperature (°C) .....:	25°C	–
	model/type of power supply .....:	HPC-420-30z DF	–
	manufacturer of power supply .....:	Sirtec International Co., Ltd.	–

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict
	rated markings of power supply .....:	See copy of marking plate	–

No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
1.	+12V to Gnd	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
2.	+5V to Gnd	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
3.	+3.3V to Gnd	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
4.	-5V to Gnd	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
5.	-12V to Gnd	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
6.	+5Vsb to Gnd	s-c	240	30 min	F1	0.15	Unit shutdown, no hazards.
7.	+12V to +5V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
8.	+12V to +3.3V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
9.	+12V to -5V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
10.	+12V to -12V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
11.	+12V to +5Vsb	s-c	240	30 min	F1	0.15	Unit shutdown, no hazards.
12.	+5V to +3.3V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
13.	+5V to -5V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
14.	+5V to -12V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
15.	+5V to +5Vsb	s-c	240	30 min	F1	2.64	Unit operated normally, no hazards.
16.	+3.3V to -5V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
17.	+3.3V to -12V	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.

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Clause	Requirement – Test	Result – Remark	Verdict

18.	+3.3V to +5Vsb	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
19.	-5V to -12V	s-c	240	30 min	F1	2.6	Unit operated normally, no hazards.
20.	-5V to +5Vsb	s-c	240	30 min	F1	0.2	Unit shutdown, no hazards.
21.	-12V to +5Vsb	s-c	240	30 min	F1	0.2	Unit shutdown, no hazards.
22.	Voltage mismatch (HPC-420-10z DF)	--	240	1 s	F1	>10	Fuse opened, VZ2 damaged, no hazards
23.	C3	s-c	240	1 s	F1	>10	Fuse opened, no hazards.
24.	BD1 AC-+	s-c	240	1 s	F1	>10	Fuse opened, no hazards.
25.	Q3 C-E	s-c	240	30 min	F1	0.15	Unit shutdown, except for +5Vsb, no hazards.
26.	Q3 C-B	s-c	240	30 min	F1	0.14	Unit shutdown, except for +5Vsb, no hazards.
27.	Q3 E-B	s-c	240	30 min	F1	0.15	Unit shutdown, except for +5Vsb, no hazards.
28.	Q4 C-E	s-c	240	30 min	F1	0.19	Fuse opened, no hazards.
29.	Q4 C-B	s-c	240	30 min	F1	0.14	Unit shutdown, except for +5Vsb, no hazards.
30.	Q4 E-B	s-c	240	30 min	F1	0.20	Unit shutdown, except for +5Vsb, no hazards.
31.	Q10 g-d	s-c	240	1 s	F1	0.14	Unit shutdown, D23 damaged, no hazards.
32.	Q10 g-s	s-c	240	30 min	F1	0.11	Unit shutdown, no hazards.
33.	Q10 d-s	s-c	240	1 s	F1	0.14	Fuse opened, D23 damaged, no hazards.
34.	U4 pin1-2	s-c	240	30 min	F1	0.13	Unit shutdown, no hazards.
35.	U4 pin1-2	o-c	240	1 s	F1	0.14	Unit shutdown, D14 damaged, no hazards.
36.	U4 pin3-4	s-c	240	30 min	F1	0.2	Unit shutdown, no hazards.
37.	U4 pin3-4	o-c	240	1 s	F1	0.11	Unit shutdown, D14 damaged, no hazards.

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Clause	Requirement – Test	Result – Remark	Verdict

38.	T2 pin13-10,11	s-c	240	30 min	F1	0.2	Unit shutdown, no hazards.
39.	T2 pin10,11-8,9	s-c	240	30 min	F1	0.2	Unit shutdown, no hazards.
40.	T2 pin8,9-12	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
41.	T3 pin2-4	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
42.	T3 pin3-4	s-c	240	30 min	F1	0.2	Unit shutdown, except for +5Vsb, no hazards.
43.	T4 pin1-2	s-c	240	1 s	F1	>10	Fuse opened, Q10 damaged, no hazards.
44.	T4 pin2-4	s-c	240	1 s	F1	>10	Fuse opened, Q10 damaged, no hazards.
45.	Fan (HPC-360-20z)	stalled	230	2.5 hr	F1	--	Unit shutdown, except for +5Vsb, no hazards. T4 = 112.5°C
46.	Ventilation opening (HPC-360-20z)	blocked	230	2 hr	F1	--	Unit shutdown, except for +5Vsb, no hazards. T4 = 123.2°C
47.	Fan (top) (HPC-420-10z DF)	stalled	230	1.5 hr	F1	--	Unit shutdown, D25 damaged, no hazards. T4 = 107.8°C
48.	Fan (side) (HPC-420-10z DF)	stalled	230	1.5 hr	F1	--	Unit operated normally, no hazards. T4 = 84.6°C
49.	Ventilation opening (HPC-420-10z DF)	blocked	230	2 hr	F1	--	Unit operated normally, no hazards. T2 = 52.3°C
50.	Fan (HPC-360-30z)	stalled	240	2 hr	F1	--	Unit shutdown, D29, D30, D31, D32 damaged, no hazards. T4 =103.5°C
51.	Ventilation opening (HPC-360-30z)	blocked	240	2 hr	F1	--	Unit shutdown, D29, D30, D31, D32 damaged, no hazards. T4 =113.9°C
52.	Fan (top) (HPC-420-30z DF)	stalled	240	2 hr	F1	--	Unit shutdown, no hazards. T4 =100.1°C
53.	Fan (side) (HPC-420-30z DF)	stalled	240	2 hr	F1	--	Unit operated normally, no hazards. T2 = 66.2°C

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

54.	Ventilation opening (HPC-420-30z DF)	blocked	240	2 hr	F1	--	Unit operated normally, no hazards. T2 = 70.3°C
55.	+12V to Gnd (HPC-360-30z)	o-l	240	8 hr	F1	--	Unit shutdown until output loaded to 19A, no hazards. T1 = 91.3°C
56.	+5V to Gnd (HPC-360-30z)	o-l	240	4.0 hr	F1	--	Unit shutdown until output loaded to 38A, no hazards. T2 = 76.2°C
57.	+3.3V to Gnd (HPC-360-30z)	o-l	240	3.5 hr	F1	--	Unit shutdown until output loaded to 31A, no hazards. T2 = 88.9°C
58.	+5Vsb to Gnd (HPC-360-30z)	o-l	240	4 hr	F1	--	Unit shutdown until output loaded to 3.0A, no hazards. T4 = 84.4°C
59.	+12V to Gnd (HPC-420-30z DF)	o-l	240	6.5 hr	F1	--	Unit shutdown until output loaded to 22.5A, no hazards. T2 = 89.5°C
60.	+5V to Gnd (HPC-420-30z DF)	o-l	240	4 hr	F1	--	Unit shutdown until output loaded to 47.4A, no hazards. T2 = 80.6°C
61.	+3.3V to Gnd (HPC-420-30z DF)	o-l	240	4 hr	F1	--	Unit shutdown until output loaded to 41A, no hazards. T1 = 87.3°C
62.	-5V to Gnd (HPC-420-30z DF)	o-l	240	3.5 hr	F1	--	Unit shutdown until output loaded to 1.4A, no hazards. T2 = 85.2°C
63.	-12V to Gnd (HPC-420-30z DF)	o-l	240	4.5 hr	F1	--	Unit shutdown until output loaded to 5.9A, no hazards. T2 = 93.7°C
64.	+5Vsb to Gnd (HPC-420-30z DF)	o-l	240	4 hr	F1	--	Unit shutdown until output loaded to 3.5A, no hazards. T4 = 117.2°C
65.	T2 pin8,9-Earth (HPC-360-30z)	o-l	240	6.5 hr	F1	--	Unit shutdown until output loaded to 13A, no hazards. T2 = 99.6°C
66.	T2 pin10,11-Earth (HPC-360-30z)	o-l	240	5.5 hr	F1	--	Unit shutdown until output loaded to 13A, no hazards. T2 = 98.4°C
67.	T2 pin12-Earth (HPC-360-30z)	o-l	240	4.5 hr	F1	--	Unit shutdown until output loaded to 7A, no hazards. T2 = 104.1°C

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

68.	T2 pin13-Earth (HPC-360-30z)	o-l	240	6 hr	F1	--	Unit shutdown until output loaded to 7.54A, no hazards. T2 = 84.7°C
69.	T2 pin8,9-Earth (HPC-420-30z DF)	o-l	240	5 hr	F1	--	Fuse opened, Q3, Q4 damaged while transformer loaded to 16A, no hazards. T2 = 87°C
70.	T2 pin10,11-Earth (HPC-420-30z DF)	o-l	240	3.5 hr	F1	--	Fuse opened, Q3, Q4 damaged while transformer loaded to 7.6A, no hazards. T2 = 88.3°C
71.	T2 pin12-Earth (HPC-420-30z DF)	o-l	240	6 hr	F1	--	Fuse opened, Q3, Q4 damaged while transformer loaded to 3.75A, no hazards. T2 = 95.4°C
72.	T2 pin13-Earth (HPC-420-30z DF)	o-l	240	6 hr	F1	--	Unit shutdown until output loaded to 0.5A, no hazards. T1 = 87.6°C
73.	T4 pin1-4(Earth) (HPC-420-30z DF)	o-l	240	3.5 hr	F1	--	Fuse opened, Q3, Q4 damaged while transformer loaded to 1.8A, no hazards. T2 = 72.6°C
74.	T4 pin2-4(Earth) (HPC-420-30z DF)	o-l	240	4 hr	F1	--	Fuse opened, Q3, Q4 damaged while transformer loaded to 2.4A, no hazards. T2 = 63.9°C
The same result occurred by using all different fuse sources.							

5.4.10	TABLE: ball pressure test of thermoplastics		P
	required impression diameter (mm) .....:	≤2 mm	
part		test temperature (°C)	impression diameter (mm)
Bobbin of PFC Choke(E.I. Dupont FR-50)		125	0.9

IEC 950			
Clause	Requirement – Test	Result – Remark	Verdict

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict

APPENDIX	EN 60950:1992+A1:1993:+A2:1993 + A3:1995 + A4:1997 + A11:1997 TEST REPORT (IEC Publication 60950 2nd edition, 1991+Amd.1,1992+Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996) CENELEC common modification, Special National condition, Nation deviation and other information according to CB Bulletin No. 101A, December 2001	P

EXPLANATION FOR ABBREVIATIONS

C = CENELEC common modification, S = Special National condition, D = National deviation, F = Other information, AT = Austria, GB = Great Britain, CH = Switzerland, DE = Germany, DK = Denmark, FI = Finland, FR = France, NO = Norway, SE = Sweden.

P = Pass, F = Fail, N = Not applicable. place in the column to the right.

1.2.4.1 S	(DK). Certain types of Class I appliances (see sub-clause 3.2.1) may be provided with a plug not establishing earthing continuity when inserted into Danish socket-outlets.	No power cord provided.	N
1.5.1 D	(SE). Add the following: NOTE: Switches containing mercury such as thermostats, relay and level controllers are not allowed.	No such switch.	N
1.6.4 S	(NO). Note 2: In Norway, due to the IT power system used, capacitors are required to be rated for the applicable phase-to-phase voltage (230V)	Considered, see report IEC 60950.	P
1.7.2 S	(NO). Note 4: In Norway, if separation between the mains and a communication system/network, other than public telecommunication networks, relies upon connection to safety earth, the equipment shall have a marking stating that is must be connected to an earthed mains socket-outlet. NOTE: For requirements to be connected to a public telecommunication network, see 6.2.1.4.	Must be evaluated with final system.	N
1.7.2 S	(SE). If the separation between the mains and a SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet when a SELV circuit is connected to network passing both unearthed and earthed electrical environment. The marking text shall be in Swedish and as follows: "Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk".	Must be evaluated with final system.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
1.7.2 D	(DK). Supply cords of Class I appliances, which are delivered without a plug, must be provided with a visible tag with the following text: "Vigtigt. Lederen med grøn/gul isolation mä Kun tilsluttes en klemme mærket ⏚ eller ⏚". If essential for the safety of the appliance, the tag must in addition be provided with a diagram, which shows the connection of the other conductors, or be provided with the following text: "For tilslutning af de øvrige ledere, se medfølgende installationsvejledning".	Must be evaluated with final system.	N
1.7.2 C	Delete note 4.	Deleted	N
1.7.5 S	(DK). 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.	No socket outlet.	N
1.7.5 D	(DK). Class II appliances shall not be fitted with socket-outlets for providing power to other appliances.	Class I equipment.	N
1.7.14 D	(DE). Directions for use with rules to prevent certain hazards for (among others) maintenance of the technical labor equipment, also for imported technical labor equipment shall be written in German language. NOTE: Of this requirement, rules for use even only by service personnel are not exempted.	Built in type SPS, not a technical labor equipment.	N
1.7.17 D	(CH). (Ordinance on environmentally hazardous substances SR 814.013) Annex 4.10 of SR 814.013 applies for batteries.	No battery inside.	N
2.3.3 C	Delete Method 4 and the line in note 1 relating to this method	Deleted.	N
2.3.6 C	Delete the note.	Deleted.	N
2.3.5 S	(NO). In Norway, marking and insulation requirements according to subclause 1.7.2, Note 4, and 6.2.1.4, Note 2, apply.	No marking required.	N
2.3.6 S	(FR). Method 3 is not acceptable.	Method 3 is not used.	P
2.3.7 C	Replace the text of this sub-clause by: Void.	Replaced.	N
2.3.9 S	(NO). Marking and insulation requirements according to this annex, subclauses 1.7.02 and 6.2.01.4 b) apply.	No marking required.	N
2.5.2 S	(DK, NO) Add after the first paragraph: "The above exception is not acceptable in pluggable equipment type A "	Added, no exception applied.	N
2.5.2 C	Delete the note.	Deleted.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
2.7.1 C	Replace the text of this sub-clause by: Basic requirements To protect against excess current, short-circuits and earth faults in primary circuits, protective devices shall be included ether as integral parts of the equipment or as a part of the building installation, subject to all of the following a), b), c) and d): (a) Except as detailed in (b) and (c), protective devices necessary to comply with the requirements of Sub-clause 5.4 shall be included as integral parts of the equipment. (b) For components in series with the mains input to the equipment such as the supply cord, appliance coupler, RFI filter and switch, short circuit and earth fault protection may be provided with protective devices in the installation. (c) It is permitted for equipment with rated current exceeding 16A, which is 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 breaker, is fully specified in the installation instruction (d) If reliance is placed on protection in the building installation, the installation instructions shall comply with Sub-clause 1.7.11 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 and 1.7.11 does not apply.	Replaced.	P
2.7.2 C	Replace the text of this sub-clause by: Void.	Replaced.	N
2.8.4 C	Delete the note.	Deleted.	N
2.9.1 S	(NO). Note 3: In Norway, due to the IT power systems used, the mains supply voltage is considered to be equal to the phase-to-phase voltage.	Mains voltage as reference voltage.	P
2.9.4.2 C	Amend the last line on page 117a as follows – Solvent-based enamel coating on winding wire is not considered to be insulation in thin sheet material. Add a new sentence below the text on page 117a as follows – Requirements for wound components are given in 2.9.4.4.		N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
2.9.4.4 C	Modify the title as follows – 2.9.4.4 Wound components Replace the first paragraph and the two dashed paragraphs as follows – Unless one of the following situations applies, interleaved BASIC, SUPPLEMENTARY or REINFORCED INSULATION complying with 2.9.4.1 or 2.9.4.2 shall be provided between the windings. - the insulation on the winding wire complies with 2.9.4.1; or - the winding wire complies with annex U; or - the insulation between the windings is provided for separation between ZNV circuits and other parts in compliance with 6.4.1. Note – Examples of insulation of winding wire complying with annex U are polyamide and FEP.		N
2.11 C	Delete notes 1, 2 and 3.	Deleted.	N
3.2.1 S	(DK). Supply cords of single phase appliances having a rated current not exceeding 10A shall be provided with a plug according to the Heavy Current Regulations Section 107-2-D1. 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. If poly-phase equipment and single-phase equipment having a rated current exceeding 10A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations Section 107-1-D1 or EN 60309-2.	No power cord provided.	N
3.2.1 S	(CH). Supply cords of equipment having a rated current not exceeding 10A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets SEV 6532-2,1991 Plug type 15 3P+N+PE 250/400V, 10A SEV 6533-2,1991 Plug type 11 L+N 250V, 10A SEV 6534-2,1991 Plug type 12 L+N+PE 250V, 10A EN 60 309 applies for plugs for currents exceeding 10A	No power cord provided.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
3.2.1 S	(GB). Apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS1363 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.	No power cord provided.	N
3.2.2 C	Delete the note and in table 10, delete the values in parentheses.	Deleted.	N
3.2.4 S	(GB). A power supply cord with conductor of 1.25mm² is allowed for equipment with rated current over 10A and up to and including 13A.	Rated current below 10A.	N
3.2.4 C	Replace "60245 IEC 53" by "H05 RR-F", "60227 IEC 52" by "H03 VV-F or H03 VVH2-F" and "60227 IEC 53" by "H05 VV-F or H05 VVH2-F". In table 11, replace the first four lines by the following: Up to and including 6 0.75 [1)] Over 6 up to and including 10 1.0 (0.75)[2)] Over 10 up to and including 16 1.5 (1.0)[3)] In the conditions applicable to table 11, delete the words "in some countries" in condition 1). In the Note delete the second sentence.	Replaced.	N
3.3.5 C	In table 13, replace the fourth and the fifth lines by: Over 10 up to and including 16 1.5 to 2.5 1.5 to by 4	Replaced.	N
3.3.5 S	(GB). The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current of over 10A and up to and including 13A is: 1.25mm² to 1.5mm² nominal cross-sectional area.	No power cord provided.	N
4.3.18 S	(GB). This test should be performed using an appropriate socket-outlet with an earthing contact.	No direct plug-in equipment.	N
4.4.4 C	Delete note 2.	Deleted.	N
5.4.9 S	(NO). Note: In Norway, the electric strength test includes testing of basic insulation in Class I pluggable equipment type B and permanently connected equipment.	Considered.	P

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
6.1 S	(CH).Protective means in the equipment shall not prevent transient surge protection in the telecommunication network from operating properly (d.c. spark-over voltage of the surge suppressor installed in the telecommunication network: approx. 245V).	No TNV.	N
6.2.1.2 C 6.2.1.3C	Add at the end of the sub-clause: This sub-clause only applies to TNV circuits normally operating in excess of the limits of SELV circuits.	No TNV.	N
6.2.1.2 S	(SE). Supplementary insulation for a primary circuit is required between any TNV circuit and any circuit that has a connection to a protective earthing terminal. In Sweden, this requirement does not apply to permanently connected equipment or pluggable equipment Type B.	No TNV.	N
6.2.1.2 S	(NO). In Norway, supplementary insulation for a primary circuits is required between any TNV circuit and any circuit that has a connection to a protective earthing terminal. This requirement does not apply to permanently connected equipment or to pluggable equipment type B, installed in areas where equipotential bonding has been applied, e.g. a telecommunication Central Office.	No TNV.	N
6.2.1.4 C	Delete the notes.	No TNV.	N
6.2.1.4 S	(NO). Note 2: In Norway, method b) is not permitted. Insulation between parts conductively connected to the supply mains and parts connected to a public telecommunication network shall comply with the requirements for double or reinforced insulation.	No TNV.	N
6.2.1.4b) S	(FI). Method b) is permitted only for permanently connected equipment or for pluggable equipment Type B.	No TNV.	N
6.2.1.5 S	(NO). Note 2: In Norway, requirements according to 6.2.1.4, Note 2, apply	No TNV.	N
6.3.3. S	(NO). In Norway, 6.3.3 is applicable for pluggable equipment type A and B and for permanently connected equipment.	No TNV.	N
6.3.3.1 S	(SE). In Sweden, requirements according to this annex ZB, subclause 6.2.1.2 apply.	No TNV.	N
6.3.3.1 S	(NO). In Norway, requirements according to subclause 6.2.1.2, national difference, 6.2.1.4, Note 2, and 6.3.3.2, Note 1, applied.	No TNV.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
6.3.3.2 S	(NO). Note 1: In Norway, exclusions are applicable for permanently connected equipment and pluggable equipment Type B only.	No TNV.	N
6.4.1 C	Delete note 2.	No TNV.	N
6.4.2.1 C	Delete note 2.	No TNV.	N
6.4.2.1 D	(AT). Equipment shall comply with Uc = 2.0kV in cases b) and c).	No TNV.	N
Annex H. D	(DE) a) A license is required by those who operate an X-ray emission source. b) A license in accordance with clause 1 is not required by those who operate an X-ray emission source on which the electron acceleration voltage does not exceed 20 kV, if 1) the local dose rate at a distance of 0.1m from the surface does not exceed 1μSv/h and 2) it is adequately indicated on the X-ray emission source that i) X-rays are generated and ii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. c) A license in accordance with clause 1 is also not required by persons who operate an X-ray emission source on which the electron acceleration voltage exceeds 20 kV, if 1) the X-ray emission source has been granted a type approval and 2) it is adequately indicated on the X-ray emission source that i) X-ray are generated, ii) the device stipulated by the manufacturer or importer guarantees that the maximum permissible local does rate in accordance with the type approval is not exceeded and iii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer.	No CRT.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
	d) Furthermore, a license in accordance with clause 1 is also not required by persons who operate X-ray emission sources on which the electron acceleration voltage does not exceed 30 kV, if 1) the X-rays are generated only by intrinsically safety CRTs complying with Enclosure III, No.6, 2) the values stipulated in accordance with Enclosure III, bi, 6.2 are limited by technical measures and specified in the device and 3) it is adequately indicated on the X-ray emission source that the X-rays generated are adequately screened by the intrinsically safe CRT.		
Annex P C	Replace the text of this annex by: See annex ZA.		**N**
Annex Q C	Add for IEC 60529: Note: Endorsed by EN 60529:1991 (not modified) Add for IEC 60707 Note: Endorsed by HD441:1983 (not modified) Add for IEC 61058-1: Note: Endorsed by EN 61058:1992 (not modified).		**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
APPENDIX	EMKO-TSE(74-SEC)207/94 TO EN 60950:1992+A1:1993+A2:1993+A3:1995+A4:1997+A11:1997 TEST REPORT (IEC Publication 60950 2nd edition, 1991 + Amd.1, 1992 + Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996) Nordic Explanations, and other information not covered by Appendix EN 60950:1992, + A1:1993 + A2:1993 + A3:1995 + A4:1997+A11:1997.		P
EXPLANATION FOR ABBREVIATIONS NF = Nordic Explanations and other information. DK = Denmark, FI = Finland, NO = Norway, SE = Sweden. P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
1.2.02.01 NF	(DK,FI,NO,SE). The heating test of separate power supplies of personal computers is carried out according to their rated output values marked on the power supplies.	Not a separate power supply.	N
1.5.01 NF	(DK,FI,NO,SE). The following capacitors are accepted across the mains: 1) X1 capacitor which complies with Publication IEC 60 384-14. 2) X2 capacitor which complies with Publication IEC 60 384-14 and which has been subjected to a pulse test according to § 12.11.2, except the value of the voltage is reduced to 2.5 kV. 3) X2 capacitor which complies with Publication IEC 60 384-14 in case the endurance test of § 12.11.2 has been modified so that the resistor of 220Ω through which the voltage of 1000 V rms is applied to the capacitor under test, is short circuited. 4) Capacitor which complies with Publication HD 195 S6, § 14.2.	X2 capacitor comply with this clause (see report IEC 60950 report).	P
1.5.02 NF	(DK,FI,NO,SE). Transient protection components shall be installed in such a way that insulation for protection against electric shock will not be bridge. This means that transient protection components must not be connected to safety earthed parts in pluggable equipment or to other accessible parts.	No transient protection components connected to safety earthed parts.	P
	-3.2.3 (DK,FI,NO,SE). Interconnection couplers in accordance with EN 60 320-2-2 are accepted. Outlets of non-standard types are not accepted.	No outlet.	N
1.7.01 NF	-1st dash (DK). When supplied in Denmark the appliances shall be set to 230 V .	Included in the voltage range.	P
	-5th dash (DK). The equipment may instead be provided with a marking indicating name, trade-mark or identify of the responsible vendor.	Refer to copy of marking plate.	P

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
2.1.04 NF	(DK,FI,NO,SE). For monitors, warning label is not required for repairing area, neither the partial shielding against contact although the voltage is> 42.4 V peak or > 60 V d.c.	Built in SPS.	N
2.5.11 NF	(DK,FI,NO,SE). Due to installation fuses of 16A, the earth resistance shall always be controlled at 25 A.	Earthing test conducted at 25A, see IEC 60950 report.	P
2.6.06 NF	(DK,FI,NO,SE). The plug is regarded to be a disconnect device and therefore a single pole mains switch is acceptable (TC 74-WG 8's recommendation).	Appliance inlet is considered as disconnect device.	N
2.6.11 NF	(DK,FI,NO). The warning label on an appliance with two or several supply connections shall be in the official language of the country in question.	Only one supply from the mains.	N
	(DK,FI,NO). UPS-appliances can be fitted with a signal lamp instead of a warning label, under the condition that the function and location of the signal lamp is correct. Audible signal is not acceptable as warning.	Equipment is not an UPS.	N
2.7.03 NF	(DK,FI,NO,SE). A single-pole protective device is acceptable.	Only one fuse on live phase.	P
2.9.01 NF	(DK,FI,NO,SE). Pollution Degree 3 is considered applicable for the following equipment which is within the scope of this standard: Document Shredder Machines.	Equipment is not a shredding machine	N
4.2.07 NF	(DK,FI,NO,SE). If there are visible cracks on the apparatus after the mechanical strength test, the apparatus is not rejected, if it still complies with the other requirements of subclause 4.2.7.	Metal enclosure.	N
4.4.04 NF	(DK,FI). Fire enclosure is required if the available power exceeds the values of a limited power source. The limited power source shall incorporate an isolating transformer and shall comply with the following: * The open-circuit voltage shall not exceed 42.4 V peak or d.c. and shall not generate voltages above the value and * The current which may be drawn for more than two minutes at any load, including short-circuit, shall not exceed 0.2 A.	Supplied from the mains.	N
	(NO). A fire enclosure is not required in spots of the equipment where the available power does not exceeded 50 VA and the available voltage 42.4 V (peak) or 60 V d.c.	Supplied from the mains.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
5.4.06 NF	(DK,FI,NO,SE). Faults need not to be carried out in circuits which are supplied by an isolating transformer and which comply with the following: * The open-circuit voltage shall not exceed 42.4 V peak or d.c. and shall not generate voltages above the value and * The current which may be drawn for more than two minutes at any load, including short-circuit, shall not exceed 0.2 A.	Supplied from the mains.	**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
APPENDIX	China National Differences according to CB Bulletin, No. 101A, December 2001 REPORT (IEC Publication 60950 2nd edition, 1991 + Amd.1, 1992 + Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996)		P
EXPLANATION FOR ABBREVIATIONS P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
1.4.5, 1.6.5	The minimum supply tolerance is −10%, +6%; GB4943 sub-clause 1.4.5 and 1.6.5: The minimum supply tolerance is −10%, +10% according to Chinese situation.	Considered, see IEC 60950 report.	P
General	IEC standard for plug is IEC 60083. The Chinese National standard for Plugs is GB1002-1996, which is not equivalent with IEC60083.	No power supply cord provided, shall be evaluated in national approval.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
APPENDIX	Japanese National Differences according to CB Bulletin No. 101A, December 2001 REPORT (IEC Publication 60950 : 1991 + A1 + A2 + A3 + A4)		P
EXPLANATION FOR ABBREVIATIONS P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
2.9.2.1	Delete entire column headed by [Nominal mains supply voltage ≤150V (Transient rating 1500V)] in Table 3. Delete ≤150V from column headed by [Nominal mains supply voltage >150V, ≤300V (Transient rating 2500V)] in Table 3.	Clearance distance from column 2 taken (≤300V)	P
2.9.2.2	Delete entire column headed by [Nominal mains supply voltage ≤150V (Maximum transient in secondary circuit 800V see condition 6)] in Table 5	Clearance distance from column 2 taken (≤300V)	P
2.9.4.4	Replacement: The following shall replace the entire existing paragraphs: Title: Wounded components BASIC, SUPPLEMENTARY, DOUBLE or REINFORCED INSULATION is permitted in a wounded component using one of the following a), b), or c) constructions or the wounded component must use interleaved insulation which complies with 2.9.4.1 or 2.9.4.2: a) the winding wire is insulated with insulation complying with 2.9.4.1 other than solution based type enamel coatings. b) the winding wire is insulated with extruded multi-layers or wrapped layers of tape (each layer can be tested for electric strength) which complies with 2.9.4.1 and complies with annex U. c) the winding wire is insulated with extruded multi-layers or wrapped layers of tape (test can be only performed on finished winding wire) and complies with annex U.	Different Japanese standard text considered.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
	Note 1 – see also 6.4.1. As to c), the number of constructional layers applied to the conductor to determine the grade of insulation of the winding wire shall not be less than as follows: - if BASIC INSULATION is required, a minimum of two layers or one extruded layer - if SUPPLEMENTARY INSULATION is required, a minimum of two layers or two extruded layers - if REINFORCED INSULATION is required, a minimum of three layers or three extruded layers As to b) and c), in case the CREEPAGE DISTANCES between wrapped layers of tape are less than Table 6 under Pollution degree 1, the distance between layers must be reliably cement together with insulation compound complying with 2.9.7 and with the test voltage in annex U.2 (Type tests) increased to 1.6 times. Note 2 – In case one layer of material is wrapped 50% or more, it is considered as two layers Where two insulated wires or one bare wire and one insulated wire are contacted inside the component and cross each other at an angle between 45° and 90°, physical separation shall be provided, for example in the form of insulating sleeving or sheet material, or by applying two times of the specified insulating layer(s), to relieve mechanical stress at the crossover point. The finished component shall pass ROUTINE TESTING for electric strength using the value of test voltage in 5.3. Compliance is checked by visual inspection and measurement, and as specified in annex U. However, the tests are not repeated if the material data sheets confirm compliance with annex U.		
5.1	Addition: Add the following to 5) as specified in Conditions applicable to table 16, parts 1 and 2 With regards to 1), insulating materials complying with Japanese requirement (Refer to Japanese difference for current IEC 60335-1 (3rd Edition) in CB Bulletin 94B), can be taken of data for that material to determine the appropriate maximum temperature rise.	For other than those complied with IEC standards, refer to added condition 8) below.	P

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
Annex U	Replacement: ANNEX U (normative) Insulated winding wires for use without interleaved insulation (see 2.9.4.4) This annex specifies winding wire whose insulation may be used to provide BASIC, SUPPLEMENTARY or REINFORCED INSULATION in wound components without interleaved insulation. This annex applies to round winding wire whose diameter is between 0.2mm and 1.00mm. With regard to other size, refer to IEC 60851.	Replaced.	N
	U.1 Wire construction If the wire is insulated with two or more spirally wrapped layers of tape, the overlap of layers shall be adequate to ensure continued overlap during manufacture of the wound component. In order to maintain the overlap of layers, wire insulation layer of wrapped layers of tape must be adequately secured.		N
	U.2 Type tests Unless it specifies, the wire shall pass the following six TYPE TESTS U.2.1 to U.2.4, carried out at a temperature between 15°C and 35°C and a relative humidity between 45% and 75%. Refer to the IEC 60851 first edition.		N
	U.2.1 Electric strength Test 13 of IEC 60851-5 (1988), 4.3.1 (test for twisted wire pairs), with a test voltage 2 times of appropriate voltage in Table 18 of this standard or 6kVr.m.s. whichever is the greater.		N
	U.2.2 Adherence and flexibility Test 8 of IEC 60851-3, with a test voltage not less than the appropriate voltage in Table 18 of this standard or 3kVr.m.s. whichever is the greater. Table U.2.2.2 – Mandrel Nominal diameter of conductor (mm) / Mandrel diameter (mm±0.2mm) 0.20 – 0.34 : 4.0 0.35 – 0.49 : 6.0 0.50 – 0.74 : 8.0 0.75 – 1.00 : 10.0 The tension of winding wire while wire is wrapped around the mandrel, should be calculated so that it is equivalent to 118MPa±10% (118N/mm²±10%) from winding wire radial.		N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
	U.2.3 Heat shock Test 9 of IEC 60851-6, 3.1 and IEC 60851-3, 5.1.1.1, with a test voltage not less than the appropriate voltage in Table 18 of this standard or 3kVr.m.s. whichever is the greater. The temperature of oven is specified in the following Table U.2.3. Table U.2.2 shows and explains required mandrel diameter and tension. Test must be performed at room ambient after taking out from oven. Table U.2.3 – Oven Temperature Class A (105) E (120) B (130) F (155) H (180) Oven Temp. (°C±2°C) 200 215 225 240 260		N
	U.2.4 Retention of electric strength after bending Test 13 of IEC 60851-5 (1988), 4.6.1 c, with a test voltage not less than the appropriate voltage in Table 18 of this standard or 3kVr.m.s. whichever is the greater. Table U.2.2 shows and explains required mandrel diameter and tension.		N
	U.3 Routine test Winding wire is subjected to electric strength test during the production in accordance with U.3.1 and U.3.2 by wire manufacturer.		N
	U.3.1 Full-length test Winding wire is subjected to electric strength test during the production for full wire length, with a test voltage not less than the appropriate voltage in Table 18 of this standard or 3kVr.m.s. or 4.2kV peak minimum.		N
	U.3.2 Audit test Test must be carried out according to IEC 60851-5 (1988) for twisted wire pairs. Electric strength test, with a test voltage 2 times of appropriate voltage in Table 18 of this standard or 6kVr.m.s. or 8.4kV peak minimum.		N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict

APPENDIX	Korean National Differences according to CB Bulletin, No. 101A, December 2001 REPORT (IEC Publication 60950 2nd edition, 1991 + Amd.1, 1992 + Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996)		**P**
EXPLANATION FOR ABBREVIATIONS P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
General	LIMITATIONS - Voltage ratings As national supply voltage is subject to be increased to 220V, an appliance rated 220V is to be allowed to obtain type approval in Korea. Either an appliance rated 110V or 220/110V is not allowed. When an appliance is supplied in Korea, it shall be set to and marked with 220V. But free voltage appliance by SMPS (Switching Mode Power Supply) is allowed and it shall be marked with "100-220V".	Rated 100-240V or 200-240V for model HPC-360-30z, HPC-360-30z DF, HPC-420-30z DF,	**P**
General	LIMITATIONS – Frequency Only appliances having supply frequency of 60Hz or a frequency range including 60Hz are accepted. When an appliance is supplied in Korea, it shall be set to and marked with 60Hz.	Certified in the 50-60Hz frequency range.	**P**
General	LIMITATIONS - Instruction Instruction manuals and appliance markings related to safety, including nameplate shall be in Korean or graphical symbols in IEC Publication 60417.	Instruction manual will be in Korean.	**N**
1.5.101	Addition: Plugs for the connection of the apparatus to the supply mains shall comply with the Korean requirements (KSC 8305).	No power plug provided.	**N**
7	Addition: Radio frequency interference The apparatus shall comply with the relevant CISPR requirements.	Power supply unit. The CISPR requirements have to be considered with the end product.	**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
APPENDIX	Singapore National Differences according to CB Bulletin, No. 101A, December 2001 REPORT (IEC Publication 60950 2nd edition, 1991 + Amd.1, 1992 + Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996)		**P**
EXPLANATION FOR ABBREVIATIONS P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
General	IT Power Systems are not allowed in the Republic of Singapore and all clauses related to IT Power Systems are not applicable.	The unit is not applied for IT Power System.	**P**
2.2.3	(a) After the first paragraph, insert the following: Conditions described in IEC Publication 60068-2-3: Test Ca: Damp Heat, Steady State (temperature: 40 ± 2°C, relative humidity: 90% to 95%) shall apply to insulation to be used under tropical conditions. (b) At the end of the last paragraph, insert the following note: NOTE: The additional requirement on humidity conditioning is drawn from Clause 10.2 of IEC 60065:1985.	See IEC 60950 report.	**P**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict

APPENDIX	Australian National Differences according to CB Bulletin No. 101A, December 2001 (AS/NZS 3260-1993) REPORT (IEC Publication 60950 2nd edition, 1991 + Amd.1, 1992 + Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996)		P
EXPLANATION FOR ABBREVIATIONS P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
1.2.12.2	Add: "TT power systems are not permitted in Australia or New Zealand."	Added.	N
1.2.12.3	Add: "IT power systems are not permitted in Australia or New Zealand." Note: Australia and New Zealand principally use multiple-earthed neutral (MEN) systems but allow TN-C for installations using metal-sheathed cables.	Added.	N
1.5.1	Add to paragraph 1: "or the other relevant Australian or New Zealand Standard."	Added.	P
1.5.2	Add to the first and third dashed items after the words "IEC component standard": "or the other relevant Australian or New Zealand Standard."	Added.	P
1.6.4	Add: "IT power systems are not permitted in Australia or New Zealand."	Added.	N
1.7.14	Add to paragraph 1: "In Australia and New Zealand all safety instructions shall be in English."	Installation instruction is in English.	P
2	Add after clause 2: "For the limit of direct current from a.c. appliances, refer to AS/NZS Appendix 3."	See Appendix 3.	N
3.2.2	Substitute for table 10: "For sizes of cables and conduits in Australia, refer to AS 3000."	No power cord provided.	N
3.2.4	Substitute for table 11: "For sizes of conductors in power supply cords use following Table 11: **Table 11** **Sizes of conductors in power supply cords** Rated current (A) — Cross-section area (mm^2) $> 0.2 \leq 3$ — 0.5* $> 3 \leq 7.5$ — 0.75 $> 7.5 \leq 10$ — 1 $> 10 \leq 16$ — 1.5 $> 16 \leq 25$ — 2.5 $> 25 \leq 32$ — 4 $> 32 \leq 40$ — 6 $> 40 \leq 63$ — 10 * This nominal cross-section area is only allowed for class II appliances if the length of the power supply cord, measured between the point where the cord, or cord guard, enters the appliance, and the entry to the plug, does not exceed 2m (0.5mm^2 three-core supply flexible cords are not permitted; see Note 2 to table 2.17 of AS/NZS 3191).	No power cord provided.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
4.3.18	Replace Clause 4.3.18 by: "Direct plug-in equipment shall not impose undue strain on the socket outlet and shall comply with the relevant Clauses 2.8.1 and 2.14.6 of AS/NZS 3112. Compliance is checked by inspection, measurement and the appropriate tests as detailed in Clauses 2.8.4 and 2.14.6 of AS/NZS 3112 using the 10 amp gauge of Appendix A of AS/NZS 3112 and by inserting the pins of the appliance, as in normal use, into a socket outlet capable of accepting a 10 amp plug complying with Figure 2.1(A) of AS/NZS 3112. The socket outlet has a horizontal pivot at a distance of 8mm behind the engagement face of the socket outlet and in the plane of the lower intersection of the centre-lines of the contact apertures. The additional torque which has to be applied to the socket outlet to maintain the engagement face in the vertical plane shall not exceed 0.25N.m."	Building in type SPS.	N
4.4.1	Add after Clause 4.4.1: "For the Australian and New Zealand alternative resistance to fire test, refer to AS/NZS Appendix 2."	Not applied for Appendix 2.	N
6.3.3.2	Add to the second dash point the following note: "NOTE: To satisfy the requirements of Clause 1.7.2 for equipment intended to be installed by service personnel, the equipment documentation or equipment warning label if equipment documentation is not supplied should contain the following or similar text: WARNING: THIS EQUIPMENT MUST ONLY BE INSTALLED AND MAINTAINED BY SERVICE PERSONNEL"	No TNV.	N
6.4.2	Replace the first paragraph by: "In Australia (this variation to IEC 60950 does not apply in New Zealand), compliance with 6.4.1 is checked by both the test of 6.4.2.1 and 6.4.2.2". Delete the fourth paragraph 'The choice of tests.....manufacturer'.	No TNV	N
6.4.2.1	Replace Clause 6.4.2.1 by: *Impulse test* The electrical separation is subjected to ten impulses of alternating polarity, using the impulse test generator of Annex N. The interval between successive impulses is 60s and the initial voltage U_0 is: - in case (a) of 6.4.1, 7kV for hand-held telephones and for handsets; and 2.5kV for other equipment; and - in case (b) and (c) 1.5kV. Notes: 1 The seven kV impulse is to simulate measured lighting surges in typical Australian rural and semi rural network lines. 2 The value of 2.5kV has been chosen primarily to ensure adequacy of the insulation concerned, but not necessarily to simulate likely overvoltages.	No TNV	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
6.4.2.2	Replace Clause 6.4.2.2 by: *Electric strength test* The electrical separation is subjected for 60s to a substantially sinusoidal voltage having a frequency of 50Hz or 60Hz, or to a d.c. voltage equal to the peak value of the prescribed a.c. voltage. The a.c. test voltage is: - in case (a) of 6.4.1 3kV - in case (b) and (c) 1.5kV. The voltage is gradually raised from zero to the prescribed voltage and then held at that value for 60s. NOTE: 1. Where there are capacitors across the insulation under test, it is recommended that d.c. test voltages are used. 2. The 3 kV and 1.5kV values have been determined considering the low frequency induced voltages from the power supply distribution system.	No TNV	**N**
Annex A	Add. after Annex title: Alternative resistance to fire test-determination if ignitability and combustion propagation	Not applied for this Appendix	**N**
Appendix 2	Add. Appendix ALTERNATE RESISTANCE TO FIRE TEST DETERMINATION OF IGNITABILITY AND COMBUSTION PROPAGATION	Not applied for this Appendix	**N**
X2.0	GENERAL This test is an alternative to the testes in Annex A to allow approval of equipment which has inadequate documentation to verify having been tested to Annex A.		**N**
X2.1	SOLID INSULATION MATERIALS AND NON-METALLIC ENCLOSURES		**N**
X2.1.1	GENERAL REQUIREMENTS Parts of non metallic material shall be subjected to the glow wire test specified in X2.1.2, X2.1.3 and X2.1.4 and if necessary by the test of X2.2		**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
X2.1.2	NON-METALLIC MATERIAL Relevant parts of non-metallic material are subjected to the glow-wire test of AS/NZS 3350.1, the test being made at a temperature of 550°C. The 550°C glow-wire test need not be carried out on parts which are made of material classified as FH 3-40 mm/min or better according to IEC 60707. The sample of material submitted to the test of IEC 60707 shall be thicker than the relevant part. Insulating material of winding bobbins and formers are subject to the glow-wire test of AS/NZS 3350.1, the test being made a temperature of 650°C. Base material of printed circuit boards with any coating or encapsulation to the needle-flame test of AS/NZS 3350.1, however, flames shall have extinguished with 15s of removal of the test flame. The flame shall be applied to an edge of the board having the lowest heat sink effect, with the board orientated in its normal position of use and at a point, if possible, not less than 10mm from a corner. The needle-flame test is not carried out on base material which is made of material classified as FV-0 according to IEC 60707. The sample of material submitted to the test of IEC 60707 shall be no thicker than that of the relevant printed circuit board. Notes: 1. The test is not carried out on printed circuit boards contained in a metal enclosure that prevents flames or burning droplets from escaping. 2. If the printed circuit board is tested with components mounted and a component ignites during the test, this would not constitute a failure of the printed circuit board material unless it is ignited by the component.		N
X2.1.3	ATTENDED EQUIPMENT For equipment which is operated while attended, parts of insulating material supporting, in contact with or in close proximity to current carrying connections, other than those in SELV circuits are subject to the glow-wire test AS/NZS 3350.1, the test being made at a temperature of 650°C. However parts of insulating material supporting, in contact with or in close proximity to screw connections which carry a current exceeding 0.5A during normal operation and which are likely to be made or remade during installation, user maintenance or when replacing a supply cord assembled with the appliance by Type X attachment, are subject to the glow-wire test AS/NZS 3350.1, the test being made at a temperature of 750°C.		N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
	Notes: 1. The test is not carried out on parts supporting welded connections. 2. 'In close proximity' is considered to be a distance not exceeding 3mm.		
X2.1.4	UNATTENDED EQUIPMENT For equipment which is operated while unattended, parts of insulating material supporting, in contact with or in close proximity to current carrying connections, other than those in SELV circuits are subject to the glow-wire test AS/NZS 3350.1, the test being made at a temperature of 750°C. However parts of insulating material supporting, in contact with or in close proximity to screw connections which carry a current exceeding 0.5A during normal operation and which are likely to be made or remade during installation, user maintenance or when replacing a supply cord assembled with the appliance by Type X attachment, are subject to the glow-wire test AS/NZS 3350.1, the test being made at a temperature of 850°C. Notes: 1. The test is not carried out on parts supporting welded connections. 2. 'In close proximity' is considered to be a distance not exceeding 3mm. During the application of glow-wire, the height and duration of flames are measured. In addition, for parts which withstand the glow-wire test but which flame during the application of the glow-wire, the surrounding parts are subject to the needle-flame test of AS/NZS 3350.1 for the measured duration of the flame after or 30s, whichever is the least if - a) They are positioned within a distance equal to the height of the flame; and b) they are likely to be impinged upon by the flame However, surrounding parts shielded by a separate barrier which meets the needle-flame test are not tested. The needle-flame test is not carried out on parts which are made of material classified as FV-0 or FV-1 according to IEC 60707. The sample of material submitted to the test of IEC 60707 shall be no thicker than the relevant part. Note: Parts likely to be impinged upon by the flame are considered to be those within the envelope of a vertical cycling having a radius of 10mm and a height equal to the height of flame, positioned above the point of the material supporting, in contact with or in close proximity to connections.		**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
X2.2	ADDITIONAL TEST REQUIREMENTS If parts, other than enclosures, do not withstand the test of clauses X2.1.3 or X2.1.4, by failure to extinguish within 30s after removal of the glow wire tip, the needle-flame test of AS/NZS 3350.1 is made on all parts of non-metallic material which are within a distance of 50mm or which are likely to be impinged upon by flame during the test of clauses X2.1.3 or X2.1.4. Parts shielded by a separate barrier which meets the flame-needle test are not tested. Notes: 1. If the enclosure does not withstand the glow-wire test the appliance is considered to have failed to meet the requirement of Appendix 2 without the need for consequential testing. 2. If other parts do not withstand the glow-wire test due to ignition of the tissue paper and if this indicates that burning or glowing particles can fall onto an external surface underneath the appliance, the appliance is considered to have failed to meet the requirement of Appendix 2 without the need for consequential testing. 3. Parts likely to be impinged upon by the flame are considered to be those within the envelope of a vertical cylinder having a radius of 10mm and a height equal to the height of the flame, positioned above the point of the material supporting, in contact with or in close proximity to connections. The needle-flame test need not be carried out on parts which are made of classified as FV-0 or FV-1 according to IEC 60707. The sample of material submitted to the test of IEC 60707 shall be no thicker than the relevant part.		N
Appendix 3	Add Appendix: D.C. COMPONENTS FROM A.C. EQUIPMENT Equipment shall be designed so that in normal use the value of any direct current in the equipment neutral will not contribute unduly to the failure of the installation earth electrode by corrosion. Any device such as isolating transformer intended to prevent direct current in the supply shall be an integral part of the equipment. Compliance is checked by inspection and by operating the equipment (a) at the rated voltage under the conditions specified in Clause 5.1; (b) on a supply free from any d.c. component; and (c) in the maximum d.c. producing mode, if any, but not exceeding normal load; and measuring the d.c. component in the supply neutral caused by the equipment as described below.	Equipment provided with a full-wave regulator.	P

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
	If it is evident from the design of the equipment that there will be no d.c. component, e.g. equipment provided with a full-wave mains power supply or a mains isolating transformer, this test is not conducted. The permissible direct current in the equipment neutral shall not exceed (i) for equipment considered as operating continuously ..... 5 mA; or (ii) for other than continuously operated equipment where t is the assessed daily average operating time, in hours .....(5*24)/t mA For equipment which is not continuously operated but includes a component or a device which is continuously energized, e.g. stand-by control or remote switching device, the summation of the product of the direct current from the control device over 24h and the direct current from the equipment for its assessed daily average operating time in hours shall not exceed 120mAh per day. The maximum value of direct current permitted in the neutral is 1.44A which could be applicable to equipment with an assessed average daily operating time of 5 min. or less. Notes: 1. When determining the assessed daily average operating time the approvals authority may accept evidence supplied by the manufacturer. 2. The d.c. peak value due to transient starting effects is ignored. The measuring system used to measure any direct current produced shall have a sufficiently high normal (series) mode rejection ratio, by the use of a low pass filter if necessary, to ensure that an overall uncertainty of less than 10% can be achieved.		

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict

APPENDIX	Canadian National Differences according to CB Bulletin No. 101A, December 2001 (IEC Publication 60950 2nd edition, 1991 + Amd.1, 1992 + Amd.2, 1993 + Amd.3, 1995 + Amd.4, 1996)	P

EXPLANATION FOR ABBREVIATIONS

P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.

Special National Conditions			
1.1.1	All equipment installations are required to be in accordance with the Canadian Electrical Code (CEC). Part 1, CAN/CSA C22.1.	Complies.	P
1.7.1	Equipment for use on supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and if it is part of a range that extended into the Table 2 "Normal Operating Conditions." Likewise, a voltage rating shall not be lower than specified "Normal Operating Condition," unless it is part of a range that extends into the "Normal Operating Conditions."	Single phase.	N
2.5.9	Terminals for permanent wiring are required to be suitable for U.S./Canadian wire gauge sizes and be rated 125 percent of the equipment rating.		N
2.5.11	The capacity of the connection between the earthing terminal and parts required to be earthed is required to comply with CAN/CSA C22.2 No. 0.4.	Considered, see IEC 60950 report.	P
2.6.2	Motor control devices are required for cord-connected equipment with a motor if the motor (a) has a nominal voltage rating greater than 120V, (b) in rated more than 12 A, or (c) is rated more than 1/3 hp (locked rotor current over 43 A).	Not motor control device.	N
2.6.8	Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position.	No vertically mounted disconnect switch or circuit breaker.	N
2.6.11	For computer room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote power off circuit.		N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
2.7.1	Suitable NEC/CEC branch circuit protection is required for all standard supply outlets and medium-base or smaller lampholders if the supply branch circuit protection is not suitable. Power distribution transformers distributing power at 100 volts or more, and rated 10KVA or more, required transformer overcurrent protection. Panelboards provided as part of information technology equipment are required to have suitable overcurrent protection.	No power outlet.	N
2.7.6	Fuses provided in the earthed circuit conductor (neutral) are only permitted for equipment rated 125V, 15A.	No fuse in neutral or earth conductors.	N
3.1.12	For lengths exceeding 2 m, external interconnecting flexible cord and cable assemblies are required to be suitable cable type (e.g. DP, CL2) described in the NEC.		N
3.2	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains shall be in accordance with the NEC and CEC.		N
3.2.1	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.	No power cord provided.	N
3.2.2	Permanent connection of equipment to the mains by a power supply cord is not permitted.	No power cord provided.	N
3.2.4	Power supply cords are required to be not longer than 4.5 m in length. Flexible power supply cords are required to be compatible with article 400 of the NEC and Table 12 of the CEC.	No power cord provided.	N
3.2.8	Permanently connected equipment is required to have a suitable wiring compartment and wiring bending space.	No power cord provided.	N
3.3	Wiring terminals and associated spacings for field wiring connections shall comply with CAN/CSA No. 0.	No wire binding screws used	N
3.3.3	Wiring binding screws are not permitted to attach conductors larger than 10 AWG (5.3mm²).	No wire binding screws used	N
4.3.12	Equipment with lasers is required to meet Code of Federal Regulations 21 CFR 1040 and Canadian Radiation Emitting Devices Act, REDR C 1370.	No Laser.	N
4.4.1	For computer room application, automated information storage systems with combustible media greater than 27 cubic feet are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
4.4.4	For computer room applications, enclosures with combustible material measuring greater than 0.9 m^2 or a single dimension greater than 1.8 m, are required to have flame spread rating of 50 or less. For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.		**N**
4.4.8	The maximum quantity of flammable liquid stored in equipment is required to meet NFPA 30.	No liquid.	**N**
	Other Differences		
1.5	Components of equipment must be suitable for the application, and must comply with the requirements of the equipment standard and the Canadian or U.S. components standards, as far as they may apply. The acceptance will be based on the following: A) A component certified by a Canadian or U.S. NCB to a Canadian or U.S. component standard will be checked for correct application and use in accordance with its specified rating. Where necessary, it will also be subjected to the applicable tests of the equipment standard. B) A component which has a CB Test Certificate for compliance with a relevant IEC component standard will be checked for correct application and use in accordance with its specified ratings. Where necessary, it will also be subjected to the applicable tests of the equipment standard, and to the applicable tests of the Canadian and U.S. component standard, under the conditions occurring in the equipment. C) A component which has no approval as in A) or B) above or which is used not in accordance its specified ratings, will be subjected to the applicable tests of the equipment standard, and to the applicable tests of the Canadian or U.S. component standard, under the conditions occurring in the equipment. D) Some components may require annual re-testing which may be carried out by the manufacturer, CSA or another laboratory.	Components are UL or CSA approved, see component list 1.5.1.	**P**
3.4	Equipment connected to a centralized d.c. power system is required to meet special earthing wiring and marking requirements.		**N**
4.1.6	Wall and ceiling mounted equipment is required to comply with special loading tests.		**N**
4.1.7	Equipment with handles is required to comply with special loading tests.		**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
4.2.9	Enclosures around C.R.T´s having a diagonal dimension of 160 mm or more are required to reduce the risk of injury due to the implosion of the CRT.	No CRT.	**N**
4.3.18	Direct plug-in equipment is required to comply with UL 1310 or CAN/CSA C22.2 No. 223 mechanical assembly requirements.		**N**
6.2.1.1	The maximum acceptable TNV circuit levels for other than ringing signals are: normal condition- (Uac/42.4 + Udc/42.4 $\leq$1 for Udc $\leq$21.2 (Uac/32.8 + Udc/60) $\leq$ 1 for Udc >21.2 abnormal conditions- (Uac/70.7 + Udc/120) $\leq$1	No TNV.	**N**
6.4.3	Equipment connected to a telecommunications network and supplied with an earphone intended to be held against the ear is required to comply with special acoustic pressure tests.	No TNV.	**N**
6.4.4	Equipment intended to receive telecommunication ringing signals is required to comply with special leakage current measurement tests.	No TNV.	**N**
6.5	Equipment intended to provided power over the telecommunication wiring system is required to limit output current to values which will not damage the telecommunication wiring system.	No TNV.	**N**
6.6	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage.	No TNV.	**N**

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
APPENDIX	US National Differences according to CB Bulletin No. 101A, December 2001 for IEC 60950 (1991) 2nd Edition, Amendment No.1 (1992), Amendment No. 2 (1993), Amendment No. 3 (1995) and Amendment No. 4 (1996)		P
EXPLANATION FOR ABBREVIATIONS P = Pass, F = Fail, N = Not applicable. Placed in the column to the right.			
The following national differences are based on national regulatory requirements.			
1.1.1	All equipment installations are required to be in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, and unless marked or otherwise identified, the Standard for the Protection Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.	Considered.	P
1.7.1	Equipment for use on supply systems with a neutral and more than one phase conductor (e.g. 120/240V, 3-wire) require a special marking format for electrical rating. A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and if it is part of a range that extends into the Table 2 "Normal Operating Conditions". Likewise, a voltage rating shall not be lower than the specified "Normal Operating Conditions", unless it is part of a range that extends into the "Normal Operating Conditions".	Single phase.	N
2.5.9	Terminals for permanent wiring are required to be suitable for U.S./Canadian wire gauge sizes and be rated 125 percent of the equipment rating.		N
2.5.11	The capacity of the connection between the earthing terminal and parts required to be earthed is required to comply with CAN/CSA C22.2 No. 0.4.	Considered, see IEC 60950 report.	P
2.6.2	Motor control devices are required for cord-connected equipment with a motor if the motor (a) has a nominal voltage rating greater than 120V, (b) is rated more than 12A, or (c) is rated more than 1/3 hp (locked rotor current over 43A).	Not motor control device.	N
2.6.8	Vertically mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the "up" position.	Not vertically mounted disconnect switch or circuit breaker.	N
2.6.11	For computer room applications, equipment with battery systems capable of supplying 750VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote power-off circuit.	No such battery.	N

National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
2.7.1	Suitable NEC/CEC branch circuit protection is required for all standard supply outlets and medium-base or smaller lampholders if the supply branch circuit protection is not suitable. Power distribution transformers distributing power at 100 volts or more, and rated 10kVA or more, require transformer overcurrent protection. Panelboards provided as part of information technology equipment are required to have suitable overcurrent protection.		N
2.7.6	Fuses provided in the earthed circuit conductor (neutral) are only permitted for equipment rated 125V, 15A.	No fuse in earthing conductor.	N
2.11	Where a fuse is used to provide current limiting, it shall not be operator-accessible unless it is not interchangeable.	No limited power source applied for.	N
3.1.12	For lengths exceeding 3.05m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g. DP, CL2) described in the NEC. For length 3.05m or less, external interconnecting flexible cord and cable assemblies which are not types specified in the NEC are required to have special construction features and identical markings.	No power cord.	N
3.2	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains shall be in accordance with the NEC and CEC.		N
3.2.1	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		N
3.2.2	Permanent connection of equipment to the mains by a power supply cord is not permitted.		N
3.2.4	Power supply cords are required to be no longer than 4.5m in length. Flexible power supply cords are required to be compatible with Article 400 of the NEC and Table 12 of the CEC.		N
3.2.8	Permanently connected equipment is required to have a suitable wiring compartment and wiring bending space.		N
3.3	Wiring terminals and associated spacings for field wiring connections shall comply with CSA C22.2 No. 0.		N
3.3.3	Wire binding screws are not permitted to attach supply conductors larger than 10 AWG (5.3mm²).		N

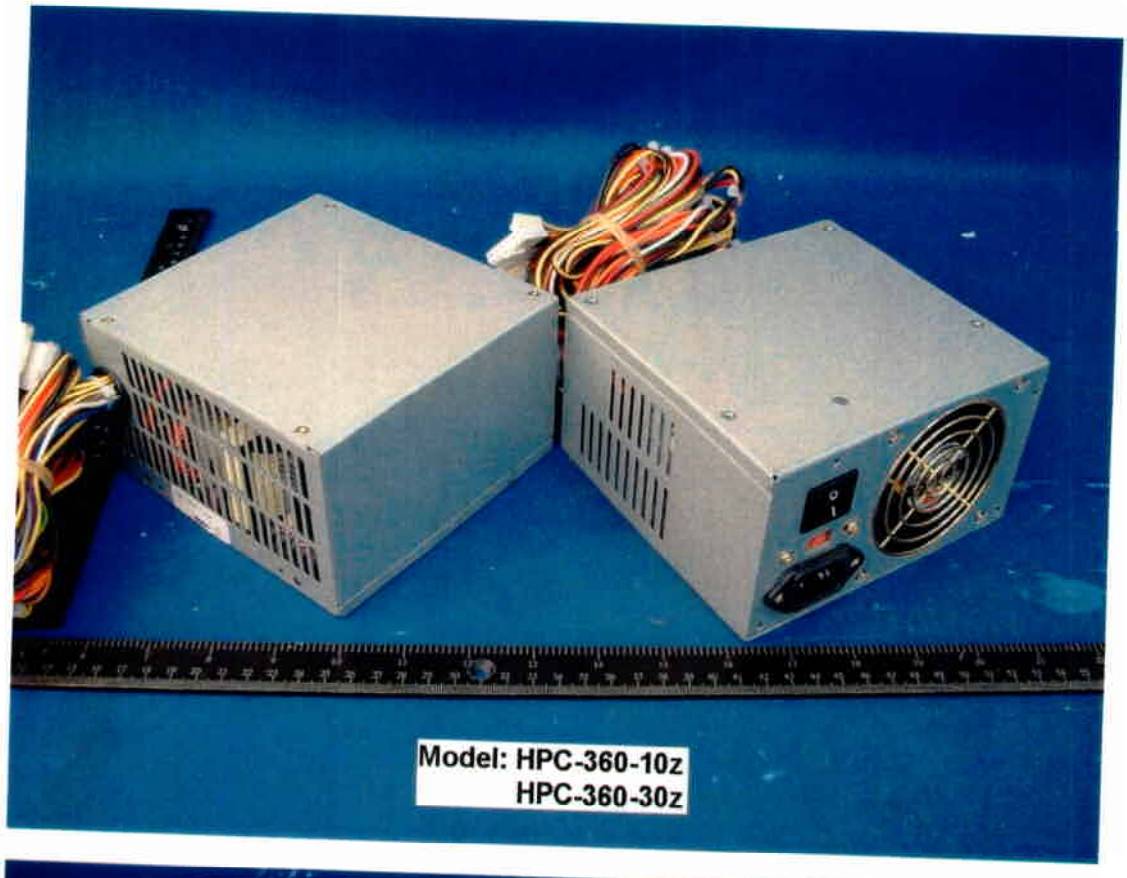
National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
4.3.12	Equipment with lasers is required to meet Code of Federal Regulations 21CFR 1040 and Canadian Radiation Emitting Devices Act, REDR C1370.	No Laser.	N
4.4.1	For computer room applications, automated information storage systems with combustible media greater than 27 cubic feet are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N
4.4.4	For computer room applications, enclosures with combustible material measuring greater than 0.93mm² or having a single dimension greater than 1.8m are required to have a flame spread rating of 50 or less. For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.		N
4.4.8	The maximum quantity of flammable liquid stored in equipment is required to meet NFPA 30.	No liquid.	N
The following national differences are based on requirements other than national regulatory requirements.			
1.5.1	Some components and materials associated with the risk of fire, electric shock, or personal injury are required to have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. These components include: attachment plugs, cathode ray tubes, circuit breakers, communication circuit accessories, cord sets and power supply cords, enclosures (outdoor), flexible cords and cables, fuses, fuseholders, ground-fault current interrupters, industrial control equipment, insulating tape, lampholders, limit controls, printed wiring, protectors for communication circuits, receptacles, solid state controls, supplementary protectors, surge suppressors, switches, thermal cutoffs, thermostats, tubing, wire connectors, and wire and cables.	Components are UL approved, see component list 1.5.1.	P
3.4	Equipment connected to a centralized d.c. power system is required to meet special earthing, wiring and marking requirements.		N
4.1.6	Wall and ceiling mounted equipment is required to comply with special loading tests.	Built in SPS.	N
4.1.7	Equipment with handles is required to comply with special loading tests.	Built in SPS.	N
4.2.9	Enclosures around CRT's with a face area of 160mm or more are required to reduce the risk of injury due to the implosion of the CRT.	No CRT.	N

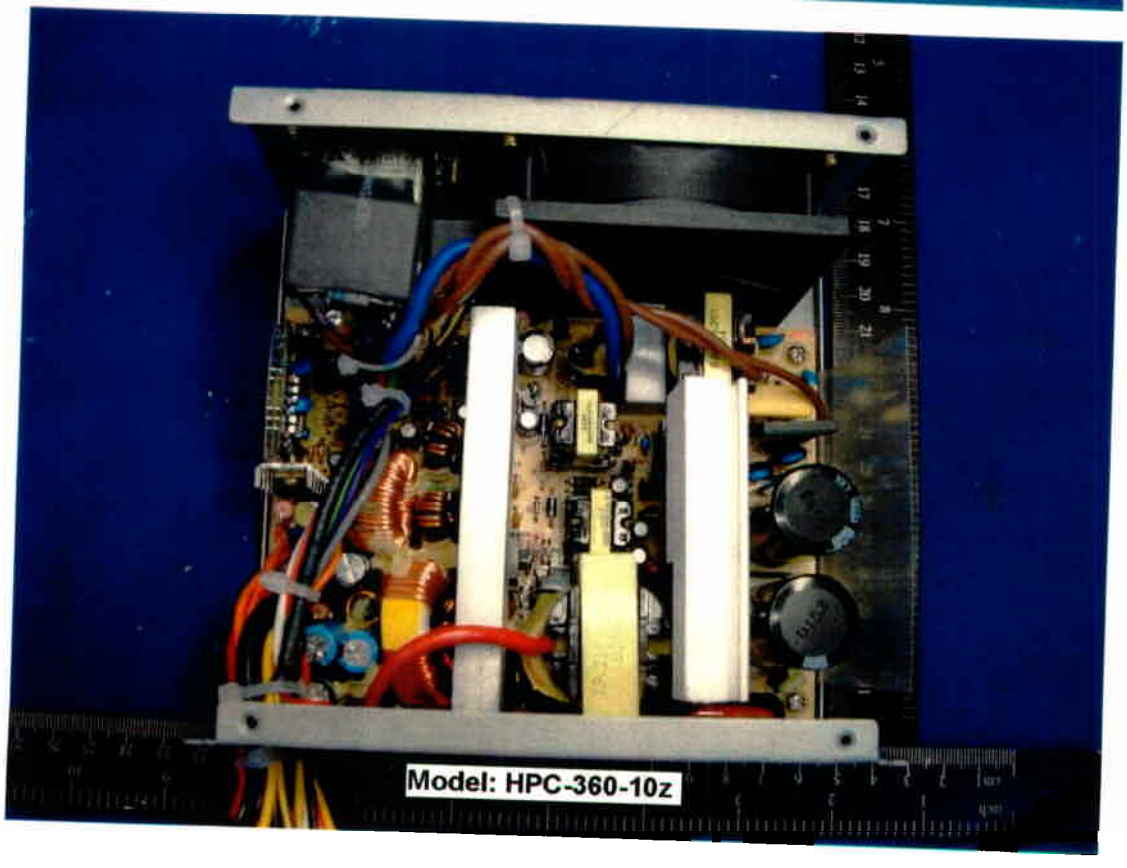
National Deviation			
Clause	Requirement – Test	Result – Remark	Verdict
6.2.1.1	The maximum acceptable TNV circuit levels for other than ringing signals are: normal condition- (Uac/42.4 + Udc/42.4 $\leq$1 for Udc $\leq$21.2 (Uac/32.8 + Udc/60) $\leq$ 1 for Udc >21.2 abnormal conditions- (Uac/70.7 + Udc/120) $\leq$1	No TNV.	N
6.2.2.2	Access restrictions to TNV-2 and TNV-3 circuits in battery compartments also apply to TNV-1 circuits.	No TNV.	N
6.3.4.3	Equipment intended to receive telecommunication ringing signals is required to comply with special leakage current measurement test.	No TNV.	N
6.4.1	Enamel coating on winding wire are not considered electrical separation unless subjected to special investigation.	No TNV.	N
6.4.3	Equipment connected to a telecommunication network and supplied with an earphone intended to be held against the ear is required to comply with special acoustic pressure tests.	No TNV.	N
6.5	Equipment intended to provide power over the telecommunication wiring system is required to limit output current to values which will not damage the telecommunication wiring system.	No TNV.	N
6.6	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage.	No TNV.	N
M.2	Continuous ringing signals up to 16mA only are permitted if subjected to special installation and performance restriction.	No TNV.	N

Type Designation: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF, HPC-420-30z DF

Report Number: 12002019 001

TÜV

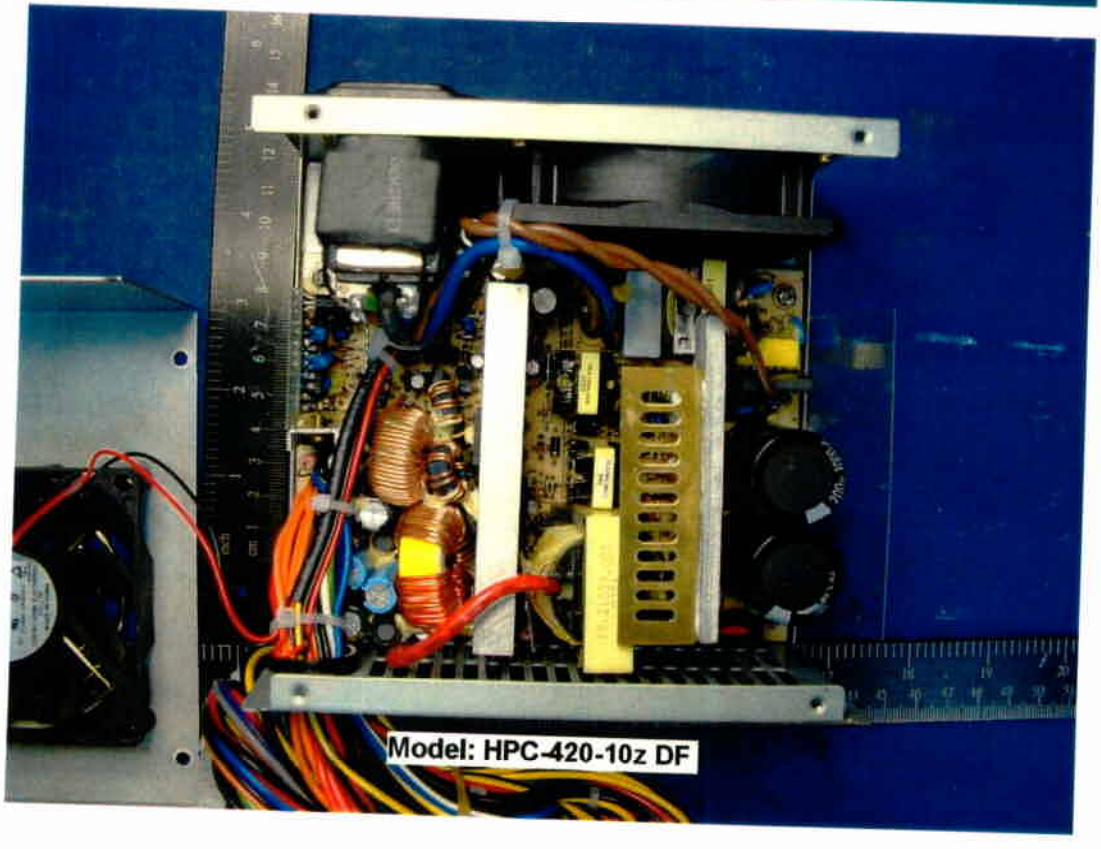




Type Designation: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF, HPC-420-30z DF

Report Number: 12002019 001

Model: HPC-360-10z DF
HPC-420-10z DF



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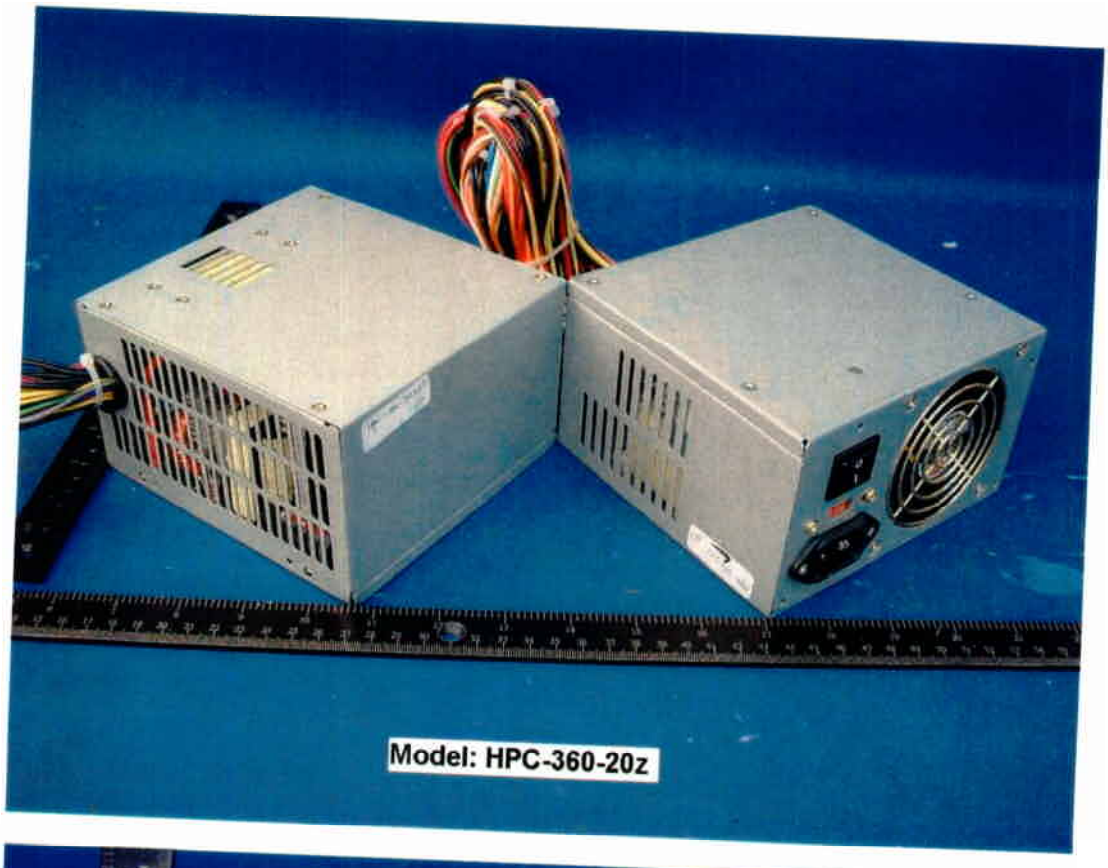
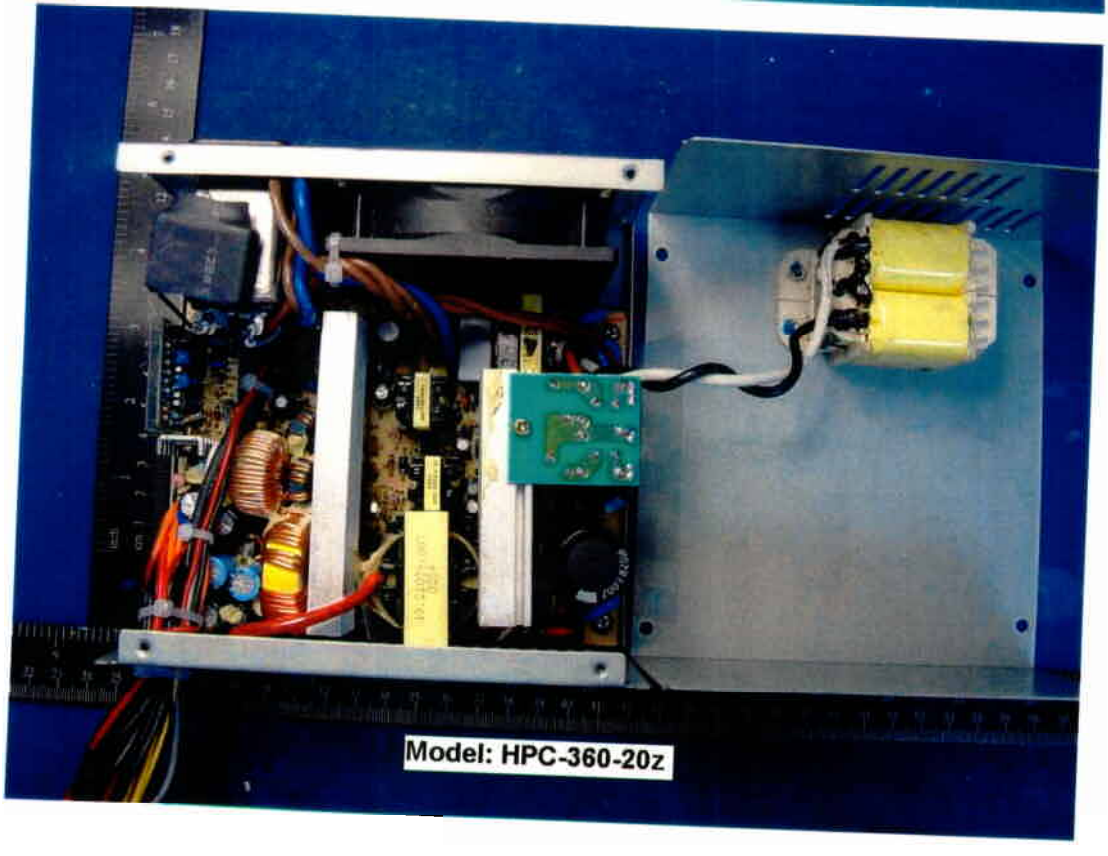
Report Number: 12002019 001





Type Designation: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF, HPC-420-30z DF

Report Number: 12002019 001

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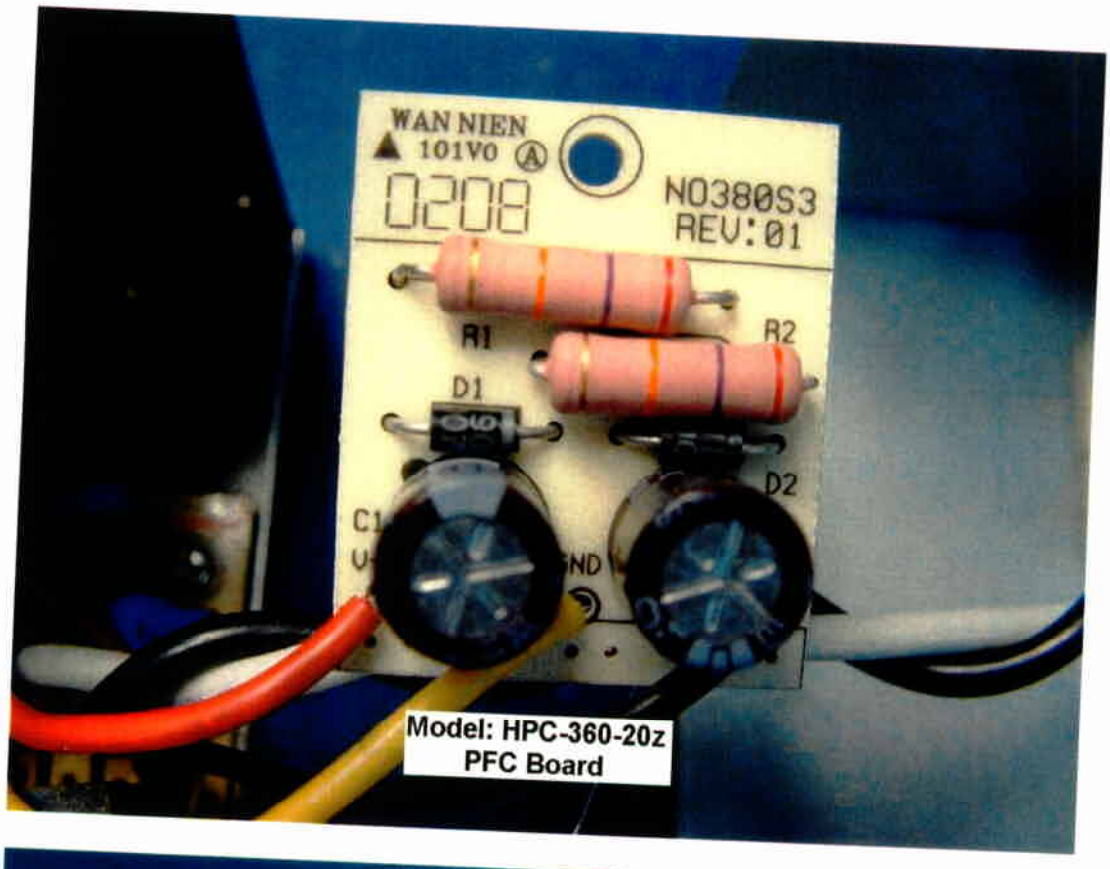

Model: HPC-360-20z
PFC Board

Model: HPC-360-30z DF
HPC-420-30z DF

Type Designation: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF, HPC-420-30z DF

Report Number: 12002019 001

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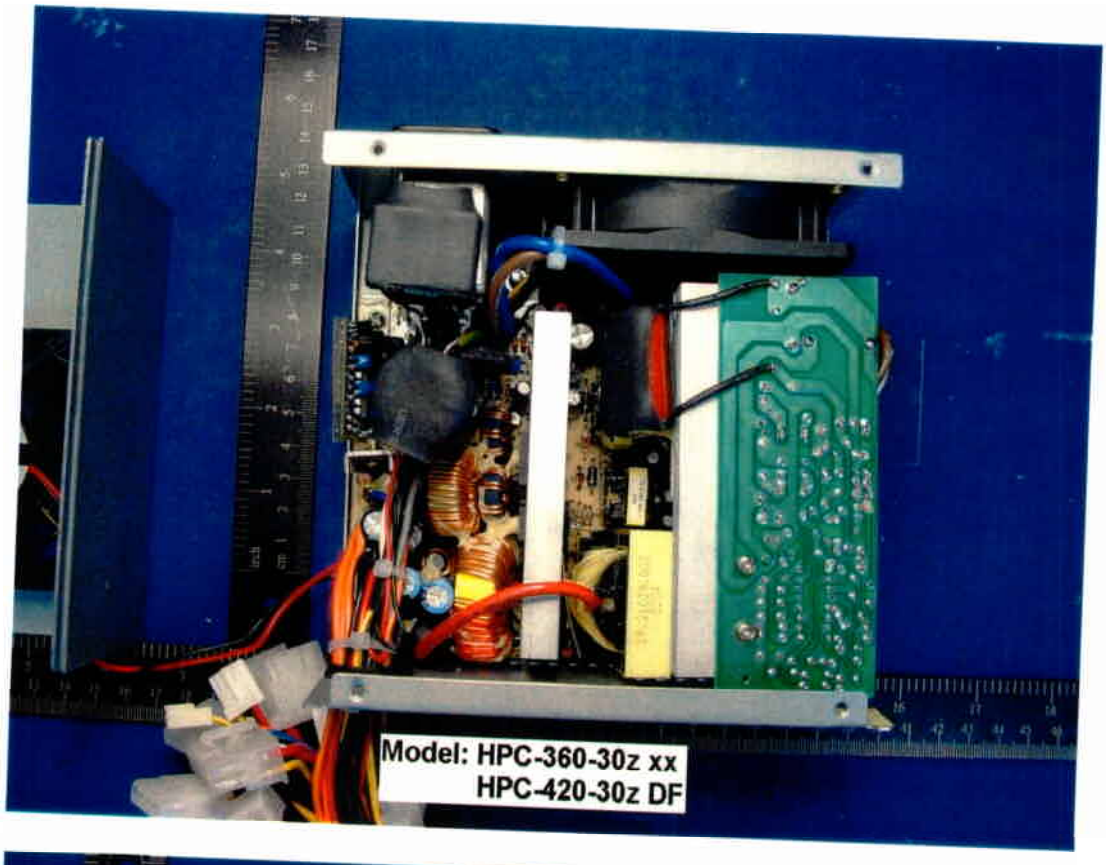
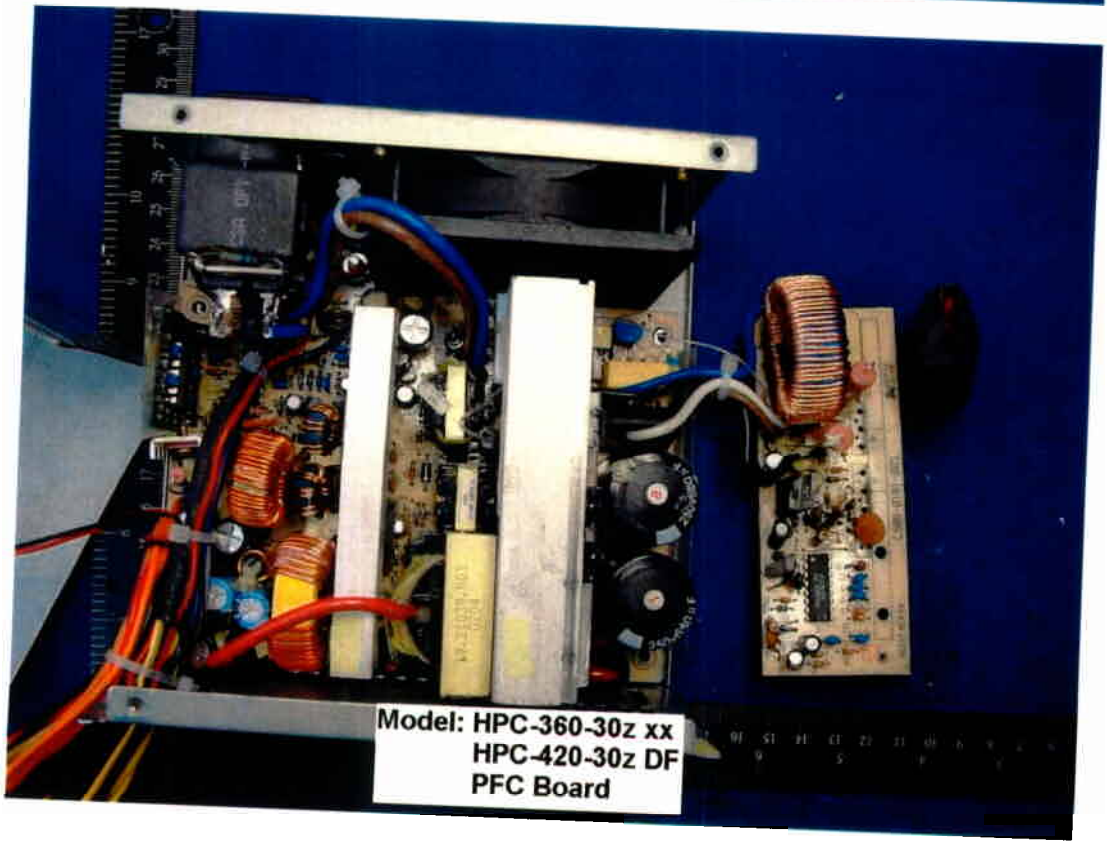
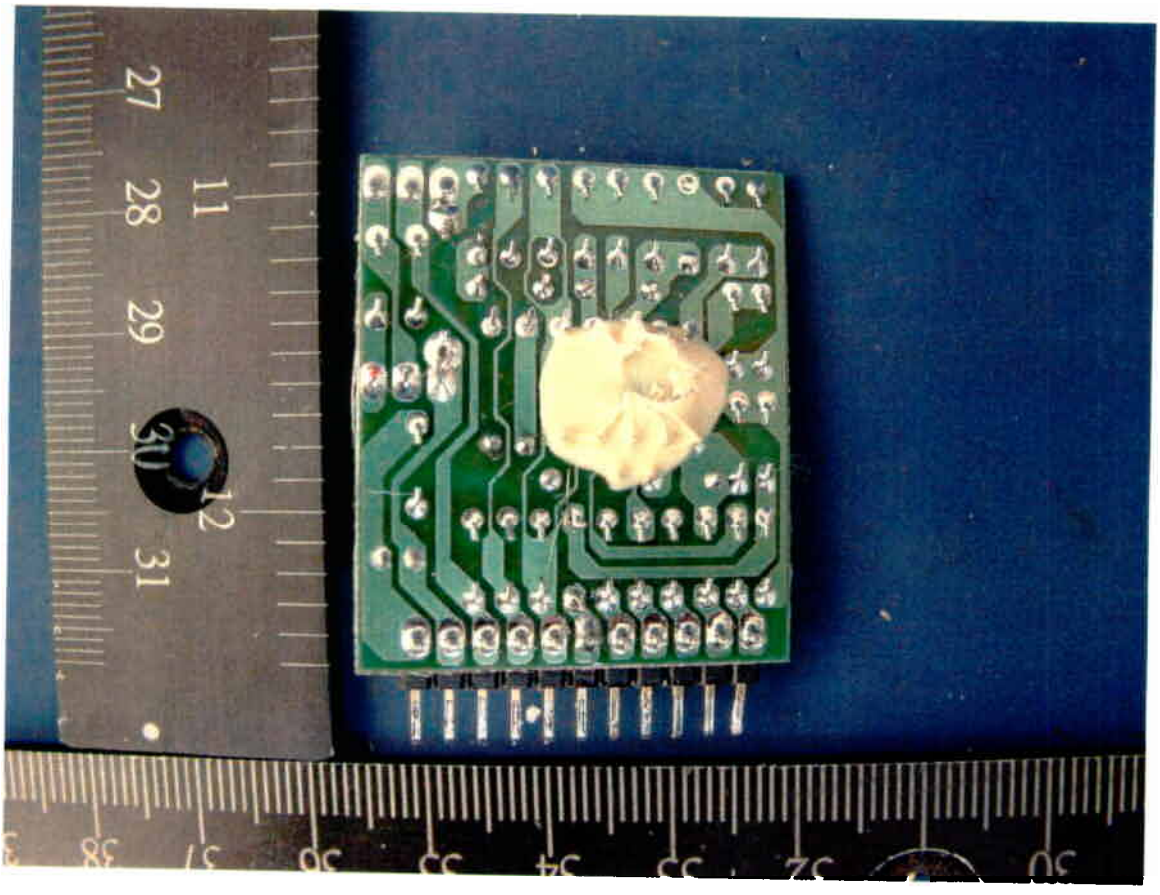
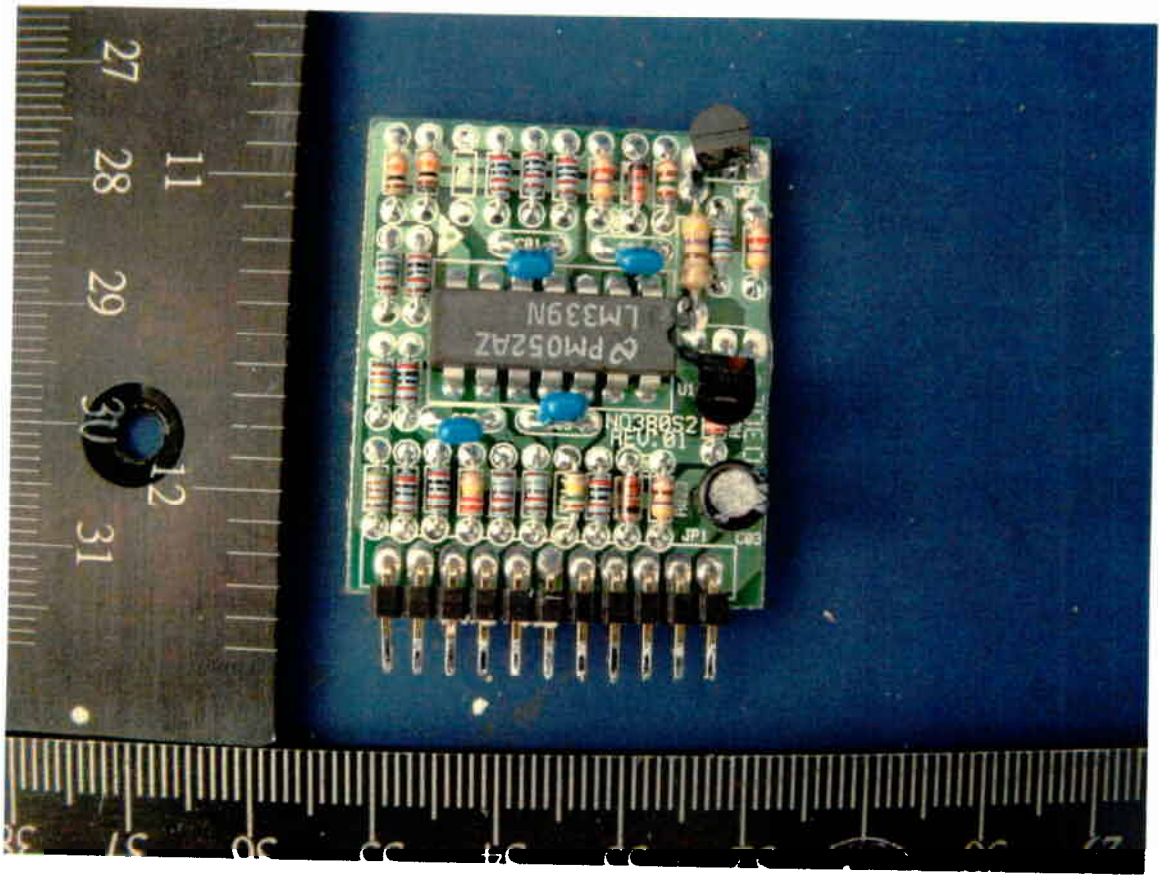




Type Designation: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF, HPC-420-30z DF

Report Number: 12002019 001





Type Designation: HPC-360-10z, HPC-360-10z DF, HPC-360-20z, HPC-360-30z, HPC-360-30z DF, HPC-420-10z DF, HPC-420-30z DF

Report Number: 12002019 001