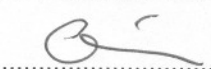


TEST REPORT IEC 60950-1 First Edition Information technology equipment – Safety – Part 1: General requirements	
Report reference No.....	081-51121-000
Tested by (printed name and signature)	Manfred Schmolke 
Approved by (printed name and signature)	Ralph Fischer 
Date of issue	2005-11-22
Testing Laboratory Name	TÜV Product Service GmbH
Address	Ridlerstr. 65, D-80339 München
Testing location	CBTL
Address	Ridlerstr. 65, D-80339 München
Applicant's Name	NPG Display Ltd. Taiwan Branch
Address	2F, No.8, Tun Hwa N. Rd., Taipei, Taiwan
Test specification	
Standard.....	IEC 60950-1:2001, First Edition
Test procedure	CB –Scheme
Non-standard test method	N
Test Report Form No.	L205GR.DOC
TRF originator.	SGS Fimko Ltd
Master TRF	Dated 2001-12
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Test item description: LCD Monitor	
Trademark.....: 1) NPG 2) NEC 3) MITSUBISHI	
Model and/or type reference: L205GR	
Manufacturer: Same as applicant.	
Factory (ies): See next page.	
Rating(s).....: 100-240 Vac, 50/60 Hz, 0.68-0.29 A	
Particulars: test item vs. test requirements	
Equipment mobility: Movable	
Operating condition.....: Continue	
Mains supply tolerance (%)......: +10%, -10%	
Tested for IT power systems: N	
IT testing, phase-phase voltage (V) : N	
Class of equipment: Class I	
Mass of equipment (kg): Approx. <u>10.0</u>	
Protection against ingress of water .: Ordinary	
Possible test case verdicts:	
- test case does not apply to the test object: N(.A.)	
- test object does meet the requirement.....: P(ass)	
- test object does not meet the requirement.....: F(ail)	
Attachments:	
Attachment No. 1 National Deviations	33 pages
Attachment No. 2 Marking Plate	1 page
Attachment No. 3 Photo	6 pages
Testing	
Date of receipt of test item: 2005-10-07	
Date(s) of performance of test: 2005-10-13 to 2005-10-20	
General remarks:	
"This report is not valid as a CB Test Report unless appended to a CB Test Certificate issued by a NCB, in accordance with IEC60950-1A".	
This 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(s) tested.	
"(see remark #)" refers to a remark appended to the report.	
"(see Annex #)" refers to an annex appended to the report.	
Throughout this report a point is used as the decimal separator.	

Factory:

- 1) NPG Display Ltd. (Factory ID No.: 26885)
Jing Xing Industrial Zone, Dongguan Qing Xi Zhen, People's Republic of China

General descriptions:

The equipment is a desk top LCD Monitor for general office use.

Backlight fulfills the requirements of limited current circuit (Clause 2.4).

Copy of marking plate:

**See attachment No. 2
(Total 1 page)**

Cl.	Requirement - Test	Result - Remark	Verdict
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1	GENERAL		P
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1.5	Components		P
1.5.1	General		P
	Comply with IEC 60950 or relevant component standard	Components which were found to affect safety aspects comply with the requirements of this standard or within the safety aspects of the relevant IEC component standards. (see appended table 1.5.1).	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
1.5.3	Thermal controls	No thermal control.	N
1.5.4	Transformers	Transformer used is suitable for their intended application and comply with the relevant requirements of the standard.	P
1.5.5	Interconnecting cables	Interconnection o/p cable to other device is carrying only SELV voltages on an energy level below 240VA. →Except for the insulation material, there is no further requirements to the o/p interconnection cable.	P
1.5.6	Capacitors in primary circuits	X2 capacitor according to IEC 60384-14: 1993 with 2.5kVdc pulse test.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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1.5.7	Double insulation or reinforced insulation bridged by components	See below.	P
1.5.7.1	General	See below	P
1.5.7.2	Bridging capacitors	Y1-capacitors C11 and C31 bridge primary to secondary return.	P
1.5.7.3	Bridging resistors	No bridging resistors provided.	N
1.5.7.4	Accessible parts	Refer to 2.4 for limited current test result.	P
1.5.8	Components in equipment for IT power systems	Equipment was not applied for the IT power system.	N

1.6	Power interface		P
1.6.1	AC power distribution systems	For TN power system only.	N
1.6.2	Input current	Highest load according to 1.2.2.1 for this equipment is the continuously. Results see appended table.	P
1.6.3	Voltage limit of hand-held equipment	This appliance is not a hand-held equipment.	N
1.6.4	Neutral conductor	Basic insulation for rated voltage between earthed parts and primary phases.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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1.7	Marking and instructions		P
1.7.1	Power rating	See below.	P
	Rated voltage(s) or voltage range(s) (V).....:	100-240 Vac.	P
	Symbol for nature of supply for d.c.....:	Mains from AC source.	N
	Rated frequency or rated frequency range (Hz)	50/60 Hz	P
	Rated current (mA or A).....:	0.68-0.29A	P
	Manufacturer's name or trademark or identification mark.....:	1) NPG 2) NEC 3) MITSUBISHI	P
	Type/model or type reference.....:	L205GR	P
	Symbol ⚡ for Class II equipment only.....:	Class I equipment.	N
	Other symbols.....:	Additional symbols or markings that do not give rise to misunderstanding.	P
	Certification marks.....:	TÜV Product Service	P
1.7.2	Safety instructions	Safety instructions in English and German. Other languages will be provided when submitted for national approval.	P
1.7.3	Short duty cycles	Equipment is designed for continuous operation.	N
1.7.4	Supply voltage adjustment.....:	No voltage/frequency setting.	N
1.7.5	Power outlets on the equipment.....:	No outlet.	N
1.7.6	Fuse identification.....:	Fuse marking printed adjacent to the fuse reads as F1 T2.5A/ 250V	P
1.7.7	Wiring terminals	See below.	P
1.7.7.1	Protective earthing and bonding terminals	Appliance inlet used.	N
1.7.7.2	Terminal for a.c. mains supply conductors	The equipment with appliance inlet is intended to be use the detachable type power supply cord.	N
1.7.7.3	Terminals for d.c. mains supply conductors	Mains from AC source only.	N

Cl.	Requirement - Test	Result - Remark	Verdict
1.7.8	Controls and indicators	See below.	P
1.7.8.1	Identification, location and marking.....:	The marking and indication of the power switch is located on the switch so that indication of function is clear.	P
1.7.8.2	Colours.....:	Green (on position)	P
1.7.8.3	Symbols according to IEC 60417.....:	The IEC 60417 No. 5007 and 5008 (1 and 0) are marked on or adjacent to the main switch. The IEC 60417 No. 5009 (⏏) is marked on or adjacent to the stand by switch.	P
1.7.8.4	Markings using figures.....:	No indicators for different positions.	N
1.7.9	Isolation of multiple power sources.....:	Only one supply from the mains.	N
1.7.10	IT power distribution systems	Equipment was not applied for IT power system.	N
1.7.11	Thermostats and other regulating devices	No used thermostats.	N
1.7.12	Language.....:	Safety warning text in German. Rating marking in English. Users manual was provided in English language, versions in other languages will be provided when the equipment will be applied for other national certificates.	P
1.7.13	Durability	The label was subjected to the permanence of marking test. The label was rubbed with cloth for 15 sec. and then again for 15 sec. with the cloth soaked with HEXANE. After this test there was no damage to the label. The marking on the label did not fade. There was no curling nor lifting of the label edge.	P
1.7.14	Removable parts	Marking is not placed on removable parts.	P
1.7.15	Replaceable batteries	No lithium battery.	N
	Language		—
1.7.16	Operator access with a tool	No operator access without a tool.	N
1.7.17	Equipment for restricted access locations	No restricted access location.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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2	PROTECTION FROM HAZARDS		P
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2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas	See below.	P
2.1.1.1	Access to energized parts	See below.	P
	Test by inspection.....	Operator can not contact with any parts with only basic insulation to ELV or hazardous voltage.	P
	Test with test finger.....:	No access with test finger to any parts with only basic insulation to ELV or hazardous voltage.	P
	Test with test pin.....:	The test pin can not touch hazardous voltage through any openings or seams of the whole enclosure.	P
	Test with test probe.....:		N
2.1.1.2	Battery compartments.....:		N
2.1.1.3	Access to ELV wiring	No ELV wiring in operator accessible area.	N
	Working voltage (V); minimum distance (mm) through insulation		—
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage wiring in operator accessible area.	N
2.1.1.5	Energy hazards.....:	No energy hazard in operator access area. The connectors of the equipment only for signal i/p and o/p on a low energy level.	P
2.1.1.6	Manual controls	None at ELV or hazardous voltage.	N
2.1.1.7	Discharge of capacitors in equipment	No risk of electric shock, see appended table.	
	Time-constant (s); measured voltage (V)	<1s; (see appended table 2.1.1.7)	—
2.1.2	Protection in service access areas	No maintenance work in operation mode necessary.	N
2.1.3	Protection in restricted access locations	The equipment is not intended to be used in restricted locations.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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2.2	SELV circuits		P
2.2.1	General requirements	42.4V peak or 60VDC are not exceeded in SELV circuit under normal operation or single fault condition.	—
2.2.2	Voltages under normal conditions (V).....	Between any SELV circuits 42.4V peak or 60VDC are not exceeded	P
2.2.3	Voltages under fault conditions (V).....	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 5.3.6.	—
2.2.3.1	Separation by double insulation or reinforced insulation (method 1)	Method 1.	P
2.2.3.2	Separation by earthed screen (method 2)		N
2.2.3.3	Protection by earthing of the SELV circuit (method 3)		N
2.2.4	Connection of SELV circuits to other circuits..	See 2.2.2 and 2.2.3. No direct connection between SELV and any primary circuits.	N

2.3	TNV circuits		N
2.3.1	Limits		N
	Type of TNV circuits.....		—
2.3.2	Separation from other circuits and from accessible parts		N
	Insulation employed		—
2.3.3	Separation from hazardous voltages		N
	Insulation employed		—
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed		—
2.3.5	Test for operating voltages generated externally		N

Cl.	Requirement - Test	Result - Remark	Verdict
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2.4	Limited current circuits		P
2.4.1	General requirements	The limits specified in 2.4.2 are not exceeded under normal operating conditions and in the event of a single failure within the equipment.	P
2.4.2	Limit values	See below.	N
	Frequency (Hz)	See appended table 2.4.2.	—
	Measured current (mA)	The peak drop voltage was measured with an oscilloscope at a 2k Ω non-inductive resistor. Result see appended table 2.4.2.	—
	Measured voltage (V)	<450V	—
	Measured capacitance (μ F)	<0.1 μ F	—
2.4.3	Connection of limited current circuits to other circuits	Primary to secondary bridged by Y1 type capacitor (C11 and C31), for compliance see sub-clause 2.4.2.	P

2.5	Limited power sources.		N
	Inherently limited output		N
	Inherently limited output		N
	Impedance limited output		N
	Overcurrent protective device limited output		N
	Regulating network limited output under normal operating and single fault condition		N
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition		N
	Output voltage (V), output current (A), apparent power (VA)		—
	Current rating of overcurrent protective device (A)		—

Cl.	Requirement - Test	Result - Remark	Verdict
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2.6	Provisions for earthing and bonding		P
2.6.1	Protective earthing	Parts of SELV circuit connected to protective earthing, refer to sub-clause 2.6.3.4.	P
2.6.2	Functional earthing	The functional earthing is connected to protective earthing.	P
2.6.3	Protective earthing and protective bonding conductors	See below.	P
2.6.3.1	General		P
2.6.3.2	Size of protective earthing conductors	Appliance inlet used. Power supply cord is not provided.	N
	Rated current (A), cross-sectional area (mm ²), AWG.....		—
2.6.3.3	Size of protective bonding conductors	Protective bonding conductor comply with the minimum conductor sizes in table 3B.	P
	Rated current (A), cross-sectional area (mm ²), AWG.....	Rated current <u>0.68-0.29</u> A, the length of the cord is not exceed 2m, cross-sectional area: <u>0.75</u> mm ²	—
2.6.3.4	Resistance (Ω) of earthing conductors and their terminations, test current (A)	<0.1 Ω	P
2.6.3.5	Colour of insulation	Green/Yellow wire used from inlet to chassis. The wire is fix reliable to the chassis with star washer and screw.	P
2.6.4	Terminals	See below.	P
2.6.4.1	General	The equipment provided with an appliance inlet.	N
2.6.4.2	Protective earthing and bonding terminals	Appliance inlet considered as protective earthing terminal.	P
	Rated current (A), type and nominal thread diameter (mm)		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors	Protective earthing conductor is in appliance inlet; green/yellow is provided for protective bonding conductor from appliance inlet to chassis.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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2.6.5	Integrity of protective earthing	See below.	P
2.6.5.1	Interconnection of equipment	This equipment has its own earthing connection. Any other units connected via the interconnecting cable to other unit shall provide SELV only. The class of equipment is class I.	P
2.6.5.2	Components in protective earthing conductors and protective bonding conductors	No switches or fuses in earthing conductor.	P
2.6.5.3	Disconnection of protective earth	It is not possible to disconnect earth without disconnecting mains as an appliance inlet is used.	P
2.6.5.4	Parts that can be removed by an operator	Plug or inlet, earthing connected before and disconnected after hazardous voltage. No other operator removable parts.	P
2.6.5.5	Parts removed during servicing	It is not necessary to disconnect earthing except for the removing of the earthed parts itself	P
2.6.5.6	Corrosion resistance	All safety earthing connections in compliance with Annex J.	P
2.6.5.7	Screws for protective bonding	No risk of stranded conductors coming loose.	P
2.6.5.8	Reliance on telecommunication network or cable distribution system	No TNV.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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2.7	Overcurrent and earth fault protection in primary circuits		N
2.7.1	Basic requirements	Equipment relies on 20A 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
	Instructions when protection relies on building installation	English.	—
2.7.2	Faults not covered in 5.3	The protection devices are well dimensioned and mounted.	P
2.7.3	Short-circuit backup protection	The equipment is considered to be pluggable equipment type A, the building installation is considered as providing short circuit protection.	P
2.7.4	Number and location of protective devices..:	Overcurrent protection by one built-in fuse, earth fault protection by fuse or circuit breaker in the phase of the building installation.	P
2.7.5	Protection by several devices	Only one protective device.	N
2.7.6	Warning to service personnel.....:	With reversible plug the final system to the mains, hazardous voltage may be still presented in the equipment after the internal fuse opens. However, as it is considered that the plug to the mains will be disconnected during service work, no marking were requested.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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2.8	Safety interlocks <i>No operator accessible areas which presents hazards in the meaning of this standard, no safety interlock is provided.</i>		N
2.8.1	General principles		N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches and relays		N
2.8.7.1	Contact gaps (mm)		N
2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N

2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	Natural rubber, asbestos or hygroscopic materials are not used.	
2.9.2	Humidity conditioning	Humidity treatment performed for 120 h.	P
	Humidity (%)	93% R.H	—
	Temperature (°C)	40°C	—
2.9.3	Grade of insulation	Please refer to 5.2, 2.10 and 4.5.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General	See 2.10.3, 2.10.4 and 2.10.5.	P
2.10.2	Determination of working voltage	The rms and the peak voltage were measured on the power adaptor. The unit was connected to a 240V TN power system and secondary ground was maintained during measurement. Results see appended table 2.10.2.	P
2.10.3	Clearances	See below.	P
2.10.3.1	General		P
2.10.3.2	Clearances in primary circuit	(see appended table 2.10.3 and 2.10.4).	P
2.10.3.3	Clearances in secondary circuits	Compliance with 5.3.4.	N
2.10.3.4	Measurement of transient voltage levels		N
2.10.4	Creepage distances	(see appended table 2.10.3 and 2.10.4).	P
	CTI tests :	CTI $\geq$ 600, CTI Material Group I (for transformer T1) and CTI rating for all materials of min. 100 (for transformer T2).	—
2.10.5	Solid insulation	See below.	P
2.10.5.1	Minimum distance through insulation	(see appended table 2.10.5).	P
2.10.5.2	Thin sheet material	The thin sheet materials of polyester tape used in transformers.	P
	Number of layers (pcs).....:	3 layers.	—
	Electric strength test	3000 Vac applied on any combination of two layers.	—
	Number of layers (pcs).....:	3 layers.	—
2.10.5.3	Printed boards	Not applied for.	N
	Distance through insulation		—
	Electric strength test for thin sheet insulating material		—
	Number of layers (pcs).....:		—

Cl.	Requirement - Test	Result - Remark	Verdict
2.10.5.4	Wound components	The secondary winding of T2 used the triple insulation magnet wire which manufactured by Furukawa, type TEX-E, class 130°C. (see appended table 2.10.5 and Annex U)	P
	Number of layers (pcs).....:	3 layers	—
	Two wires in contact inside wound component; angle between 45° and 90°.....:	Prevented by insulating sleeving.	—
2.10.6	Coated printed boards	No coated printed wiring boards.	N
2.10.6.1	General		N
2.10.6.2	Sample preparation and preliminary inspection		N
2.10.6.3	Thermal cycling		N
2.10.6.4	Thermal ageing (°C).....:		N
2.10.6.5	Electric strength test		—
2.10.6.6	Abrasion resistance test		N
	Electric strength test		—
2.10.7	Enclosed and sealed parts.....:	No hermetically sealed components.	N
	Temperature T1=T2 = Tma – Tamb +10K (°C).....:		—
2.10.8	Spacings filled by insulating compound	Optocoupler is approved component. Other components not applied for. (see appended table 2.10.5.)	P
	Electric strength test	(see appended table 5.2).	—
2.10.9	Component external terminations	(see appended table 2.10.3 and 2.10.4).	P
2.10.10	Insulation with varying dimensions	Insulation kept homogenous.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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3	WIRING, CONNECTIONS AND SUPPLY		P
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3.1	General		P
3.1.1	Current rating and overcurrent protection	All internal wires are UL recognised wiring that is PVC insulated, rated VW-1, min. 80°C, 300V. Internal wiring gauge is suitable for current intended to be carried.	P
3.1.2	Protection against mechanical damage	Wires do not touch sharp edges and heatsinks which could damage the insulation and cause hazard.	P
3.1.3	Securing 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 or quick connect terminals so that a loosening of the terminal connection is unlikely.	P
3.1.4	Insulation of conductors	Securely held on PCB. No hazard. The insulation of the individual conductors are suitable for the application and the working voltage. For the insulation material see 3.1.1.	P
3.1.5	Beads and ceramic insulators	Not used.	N
3.1.6	Screws for electrical contact pressure	Electrical connections screwed two or more complete threads into metal.	P
3.1.7	Insulating materials in electrical connections	All current carrying and safety earthing connections are metal to metal	P
3.1.8	Self-tapping and spaced thread screws	No self tapping screws are used.	P
3.1.9	Termination of conductors	Provided with an appliance inlet.	P
	10 N pull test		P
3.1.10	Sleeving on wiring	Sleeving on wiring reliable kept in position by cable ties or by the use of heatshrink sleeving.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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3.2	Connection to an a.c. mains supply or a d.c. mains supply		P
3.2.1	Means of connection	Provided with an appliance inlet.	P
3.2.1.1	Connection to an a.c. mains supply		P
3.2.1.2	Connection to a d.c. mains supply		N
3.2.2	Multiple supply connections	Only one supply connection.	N
3.2.3	Permanently connected equipment	The unit is not a permanent connected equipment.	N
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4	Appliance inlets	The appliance inlet complies with IEC 60320. The power cord can be inserted without difficulties and does not support the unit.	P
3.2.5	Power supply cords	(see appended table 1.5.1)	P
3.2.5.1	AC power supply cords	Ditto.	—
	Type	Ditto.	—
	Rated current (A), cross-sectional area (mm ²), AWG.....	Ditto.	—
3.2.5.2	DC power supply cords		N
3.2.6	Cord anchorages and strain relief	Appliance inlet is used.	N
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage	No parts under this unit likely to damage the power supply cord. No sharp edges.	P
3.2.8	Cord guards	The equipment is neither hand held nor intended to be moved during operation.	N
	D (mm); test mass (g)		—
	Radius of curvature of cord (mm)		—
3.2.9	Supply wiring space	Equipment provided with an appliance inlet.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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3.3	Wiring terminals for connection of external conductors <i>Unit with detachable power supply cord, connected on appliance inlet.</i>		N
3.3.1	Wiring terminals		N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm ²)		—
3.3.5	Wiring terminal sizes		N
	Rated current (A), type and nominal thread diameter (mm)		—
3.3.6	Wiring terminals design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N

Cl.	Requirement - Test	Result - Remark	Verdict
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3.4	Disconnection from the mains supply		N
3.4.1	General requirement	The appliance inlet is considered to be the disconnect device.	P
3.4.2	Disconnect devices	Appliance inlet.	P
3.4.3	Permanently connected equipment	The unit is not permanently connected equipment.	N
3.4.4	Parts which remain energized	When disconnect device is disconnected no remaining parts with hazardous voltage in the equipment	P
3.4.5	Switches in flexible cords	No isolation switch provided.	N
3.4.6	Single-phase equipment and d.c. equipment	The disconnect device disconnects both poles simultaneously.	P
3.4.7	Three-phase equipment	Equipment is single phase.	N
3.4.8	Switches as disconnect devices	No switch or the switch is not a disconnect device.	N
3.4.9	Plugs as disconnect devices	The appliance inlet is considered to be the disconnect device.	N
3.4.10	Interconnected equipment	No interconnections using hazardous voltages.	N
3.4.11	Multiple power sources	Only one supply connection provided.	N

3.5	Interconnection of equipment		P
3.5.1	General requirements	See below.	N
3.5.2	Types of interconnection circuits.....:	Interconnection circuits of SELV through the output connectors. No ELV interconnection circuits.	P
3.5.3	ELV circuits as interconnection circuits	No ELV interconnection.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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4	PHYSICAL REQUIREMENTS		P
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4.1	Stability		N
	Angle of 10°	This appliance is of a stable mechanical construction and does not overbalance when tilted to an angle of 10 degrees from its normal upright position.	P
	Test: force (N)	Equipment is not a floorstanding unit.	N

4.2	Mechanical strength		N
4.2.1	General	See below.	P
4.2.2	Steady force test, 10 N	10N applied to components.	P
4.2.3	Steady force test, 30 N	30N applied to internal chassis.	P
4.2.4	Steady force test, 250 N	250N applied to outer enclosure.	P
4.2.5	Impact test	500g steel sphere ball fall, from 1.3m height onto outer plastic enclosure. The test was done with all enclosure materials. No safety relevant damages.	P
	Fall test	Ditto.	P
	Swing test	Ditto.	P
4.2.6	Drop test	The unit is not a hand-held or direct plug-in equipment.	N
4.2.7	Stress relief	After 7h at 70°C and cooling down to room temperature, no shrinkage, distortion or loosening of enclosure parts was noticeable on the equipment. The test was conducted with all enclosure materials.	P
4.2.8	Cathode ray tubes	Unit does not employ a cathode ray tube.	N
	Picture tube separately certified		—
4.2.9	High pressure lamps	No high pressure lamp provided.	N
4.2.10	Wall or ceiling mounted equipment; force (N).....:		N

Cl.	Requirement - Test	Result - Remark	Verdict
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4.3	Design and construction		P
4.3.1	Edges and corners	Edges and corners of the enclosure are rounded.	P
4.3.2	Handles and manual controls; force (N)		N
4.3.3	Adjustable controls	No hazardous adjustments accessible to the operator.	P
4.3.4	Securing of parts	Electrical and mechanical connections can be expected to withstand usual mechanical stress. For the protection, solder pins, cable ties and heatshrink tubing are used.	P
4.3.5	Connection of plugs and sockets	No interchangeable plugs and sockets.	N
4.3.6	Direct plug-in equipment	The equipment is not a direct plug-in unit.	N
	Dimensions (mm) of mains plug for direct plug-in		—
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N)		—
4.3.7	Heating elements in earthed equipment	No heating elements.	N
4.3.8	Batteries	No lithium battery.	N
4.3.9	Oil and grease	Insulation not in contact with oil or grease.	N
4.3.10	Dust, powders, liquids and gases	Equipment in intended use not considered to be exposed to these.	N
4.3.11	Containers for liquids or gases	The equipment does not contain liquid.	N
4.3.12	Flammable liquids	No flammable liquids in this unit.	N
	Quantity of liquid (l)		—
	Flash point (°C)		—

Cl.	Requirement - Test	Result - Remark	Verdict
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4.3.13	Radiation; type of radiation	No ionising radiation, laser or flammable gases presents.	N
4.3.13.1	General		N
4.3.13.2	Ionizing radiation		N
	Measured radiation (pA/kg)		—
	Measured high-voltage (kV)		—
	Measured focus voltage (kV)		—
	CRT markings		—
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N
4.3.13.5	Laser (including LEDs)		N
	Laser class		—
4.3.13.6	Other types		N

4.4	Protection against hazardous moving parts		N
4.4.1	General	No hazardous moving part.	N
4.4.2	Protection in operator access areas	No hazardous moving part.	N
4.4.3	Protection in restricted access locations	The equipment is not intended to be used in restricted locations.	N
4.4.4	Protection in service access areas	No hazardous moving part.	N

4.5	Thermal requirements		P
4.5.1	Maximum temperatures	(see appended table 4.5.1).	P
	Normal load condition per Annex L	Maximum normal load which specified by manufacturer.	
4.5.2	Resistance to abnormal heat	(see appended table 4.5.2).	P

Cl.	Requirement - Test	Result - Remark	Verdict
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4.6	Openings in enclosures		N
4.6.1	Top and side openings	Hazardous parts are not located within 5 degree of openings.	P
	Dimensions (mm)	(see appended table)	—
4.6.2	Bottoms of fire enclosures	Metal bottom min. 1.0 mm thick and max. diameter of holes not greater than 2.0mm. Hazardous parts are not located within 5 degree of openings.	P
	Construction of the bottom.....	(see appended table)	—
4.6.3	Doors or covers in fire enclosures	No door or cover within fire enclosure.	N
4.6.4	Openings in transportable equipment		N
4.6.5	Adhesives for constructional purposes	No barrier or screen secured with adhesive.	N
	Conditioning temperature (°C)/time (weeks) ...		—

Cl.	Requirement - Test	Result - Remark	Verdict
4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	Use of materials with the required flammability classes and testing in Single Fault Conditions.	P
	Method 1, selection and application of components wiring and materials	Selection and application of components and materials which minimize the possibility of ignition and spread of flame.	P
	Method 2, application of all of simulated fault condition tests	Application of the simulated fault tests in 5.3.6.	P
4.7.2	Conditions for a fire enclosure	See below.	P
4.7.2.1	Parts requiring a fire enclosure	With having the following components: - components in primary - components in secondary (not supplied by LPS) - components having unenclosed arcing parts at hazardous voltages or energy level - insulated wiring The fire enclosure is required	P
4.7.2.2	Parts not requiring a fire enclosure	See 4.7.2.1	N
4.7.3	Materials		P
4.7.3.1	General	Integrated circuits and small electrical parts mounted on a printed wiring board min. rated V-1 or better.	P
4.7.3.2	Materials for fire enclosures	Enclosure of this unit (movable equipment, <18Kg) with flammability class V-1 or better.	P
4.7.3.3	Materials for components and other parts outside fire enclosures	No components or parts outside fire enclosures.	N
4.7.3.4	Materials for components and other parts inside fire enclosures	Internal components except small parts are V-2, HF-2 or better.	P
4.7.3.5	Materials for air filter assemblies	No air filter assemblies.	N
4.7.3.6	Materials used in high-voltage components	No high voltage component used.	N

Cl.	Requirement - Test	Result - Remark	Verdict
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5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
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5.1	Touch current and protective conductor current		N
5.1.1	General	The touch current was measured from primary to chassis.	P
5.1.2	Equipment under test (EUT)	(see appended table)	P
5.1.3	Test circuit	Equipment is tested using the test circuit in figure 5A.	P
5.1.4	Application of measuring instrument	Tests are conducted using one of the measuring instruments in annex D, or any other circuit giving the same results.	P
5.1.5	Test procedure	(see appended table)	P
5.1.6	Test measurements	(see appended table)	P
	Test voltage (V)		—
	Measured touch current (mA)		—
	Max. allowed touch current (mA)		—
	Measured protective conductor current (mA)		—
	Max. allowed protective conductor current (mA)		—
5.1.7	Equipment with touch current exceeding 3.5 mA	Touch current does not exceed 3.5mA.	N
5.1.8	Touch currents to and from telecommunication networks and cable distribution systems and from telecommunication networks		N
5.1.8.1	Limitation of the touch current to a telecommunication network and a cable distribution system		N
	Test voltage (V)		—
	Measured touch current (mA)		—
	Max. allowed touch current (mA)		—
5.1.8.2	Summation of touch currents from telecommunication networks		N

Cl.	Requirement - Test	Result - Remark	Verdict
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5.2	Electric strength		N
5.2.1	General	All tests voltages were applied for 1minute in the chamber after the humidity test of 2.9.2and in warm conditions after the heating test of 4.5.1 No isolation breakdown was observed (results see appended tables).	P
5.2.2	Test procedure	(see appended table 5.2) .	P

5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	Ventilation openings covered and output overload test: results see appended table. After test the electric strength test was conducted. No isolation break down was noted.	P
5.3.2	Motors	No motors.	N
5.3.3	Transformers	No high temp. of the transformer are to be observed or to be expected. (see appended table 5.3 and Annex C).	P
5.3.4	Functional insulation	Short Circuit tests. Result see appended table 5.3.	P
5.3.5	Electromechanical components	No electromechanical components.	N
5.3.6	Simulation of faults	The power supply is protected by the following means: ■ Overcurrent fuse F1 ■ OPP protection by PHC1, R29, D31, PHC2, R51, Q9 and D19. ■ OCP protection by PHC1, R46 and R45. ■ OVP protection by PCH4, R60, D18 and D19. Results see appended table.	P
5.3.7	Unattended equipment	None of them are used.	N
5.3.8	Compliance criteria for abnormal operating and fault conditions	No fire propagated beyond the equipment. No molten metal was emitted. Electric strength test primary→SELV and primary→ground were passed.	P

Cl.	Requirement - Test	Result - Remark	Verdict
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6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
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6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements	(see appended table 5.2)	N
	Test voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2	Exclusions		N

6.2	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1	Separation requirements		N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test	(see appended table 5.2)	N
6.2.2.2	Steady-state test	(see appended table 5.2)	N
6.2.2.3	Compliance criteria		N

6.3	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A)		—
	Current limiting method		—

Cl.	Requirement - Test	Result - Remark	Verdict
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7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N
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7.1	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N
7.2	Protection of equipment users from overvoltages on the cable distribution system		N
7.3	Insulation between primary circuits and cable distribution systems		N
7.3.1	General		N
7.3.2	Voltage surge test	(see appended table 5.2)	N
7.3.3	Impulse test	(see appended table 5.2)	N

Cl.	Requirement - Test	Result - Remark	Verdict
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A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		N
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N
A.1.1	Samples		—
	Wall thickness (mm)		—
A.1.2	Conditioning of samples; temperature (°C)		N
A.1.3	Mounting of samples.....		N
A.1.4	Test flame		N
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s).....		—
	Sample 2 burning time (s).....		—
	Sample 3 burning time (s).....		—
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N
A.2.1	Samples, material		—
	Wall thickness (mm)		—
A.2.2	Conditioning of samples		N
A.2.3	Mounting of samples		N
A.2.4	Test flame		N
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s).....		—
	Sample 2 burning time (s).....		—
	Sample 3 burning time (s).....		—
A.2.7	Alternative test acc. to IEC 60695-2-2, cl. 4, 8		N
	Sample 1 burning time (s).....		—
	Sample 2 burning time (s).....		—
	Sample 3 burning time (s).....		—
A.3	Hot flaming oil test (see 4.6.2)		N
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

Cl.	Requirement - Test	Result - Remark	Verdict
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B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N
B.1	General requirements		N
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—
B.2	Test conditions		N
B.3	Maximum temperatures	(see appended table 5.3)	N
B.4	Running overload test	(see appended table 5.3)	N
B.5	Locked-rotor overload test		N
	Test duration (days)		—
	Electric strength test: test voltage (V)		—
B.6	Running overload test for d.c. motors in secondary circuits		N
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1	Test procedure	(see appended table 5.3)	N
B.7.2	Alternative test procedure; test time (h).....		N
B.7.3	Electric strength test	(see appended table 5.2)	N
B.8	Test for motors with capacitors	(see appended table 5.3)	N
B.9	Test for three-phase motors	(see appended table 5.3)	N
B.10	Test for series motors		N
	Operating voltage (V)		—

Cl.	Requirement - Test	Result - Remark	Verdict
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C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		P
	Position	(see appended table 1.5.1).	—
	Manufacturer	(see appended table 1.5.1).	—
	Type	(see appended table 1.5.1).	—
	Rated values	(see appended table 1.5.1).	—
	Method of protection		—
C.1	Overload test	(see appended table 5.3).	P
C.2	Insulation	(see appended table 5.2).	P
	Protection from displacement of windings.....		P

Cl.	Requirement - Test	Result - Remark	Verdict
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C.2	Safety isolation transformer		P
Construction details:			
Transformer T1			
Mfr.: Tamura Corporation			
Type: TO-5736			
Recurring peak voltage		524V	
Required clearance insulation (from table 2H and 2J, pollution degree 2)			
for Reinforced		4.4mm	
for Basic		2.2mm	
Effective voltage rms		308V	
Required creepage insulation (from table 2L, pollution degree 2, material group I)			
for Reinforced		5.0mm	
for Basic		2.5mm	
Measured min. Creepages			
prim-sec (Reinforced)		6.0mm	
prim-core (Basic)		3.6mm	
sec-core (Basic)		3.6mm	
Measured min. clearances			
prim-sec (Reinforced)		6.0mm	
prim-core (Basic)		3.6mm	
sec-core (Basic)		3.6mm	

Cl.	Requirement - Test	Result - Remark	Verdict
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Construction:	
Concentric windings on TP4 type core, three layers insulation between primary and secondary winding. Winding ends additionally fixed with tape, outer winding is primary. The distance from primary winding to secondary is 6.0mm.	
Pin numbers	
Prim.	1→2; 4→5; 5→6
Sec.	12→7; 11→9; 10→8
Bobbin	
Material	Sumitomo, phenolic type PM-9820 and PM-9720.
Thickness	Min. 0.71mm
Electric strength test	
With AC 3000V after humidity treatment	
Result	Pass

Cl.	Requirement - Test	Result - Remark	Verdict
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C.2	Safety isolation transformer		P
Construction details:			
Transformer T2			
Mfr.: Tamura Corporation			
Type: TO-5737			
Recurring peak voltage		484V	
Required clearance insulation (from table 2H and 2J, pollution degree 2)			
for Reinforced		4.2mm	
for Basic		2.1mm	
Effective voltage rms		308V	
Required creepage insulation (from table 2L, pollution degree 2, material group CTI IIIb)			
for Reinforced		6.6mm	
for Basic		3.3mm	
Measured min. creepages			
prim-sec (Reinforced)		≥8.1mm	
sec-core (Reinforced)		≥8.2mm	
Measured min. Clearances			
prim-sec (Reinforced)		≥8.1mm	
sec-core (Reinforced)		≥8.2mm	

Cl.	Requirement - Test	Result - Remark	Verdict
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Construction:	
Concentric windings on TP4 type core, one layer insulation between primary (enamelled copper wire) and secondary winding (triple insulated wire). Winding ends additionally fixed with tape, outer winding is primary. Details of triple insulated wire used, see appended table 1.5.1.	
Pin numbers	
Prim.	1-J; 2-J; 3-5; 4-5
Sec.	10-6; 9-7
Bobbin	
Material	Sumitomo, phenolic type PM-9820 and PM-9720.
Thickness	Min. 0.71mm
Electric strength test	
With AC 3000V after humidity treatment	
Result	Pass

Cl.	Requirement - Test	Result - Remark	Verdict
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D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS		N
D.1	Measuring instrument		N
D.2	Alternative measuring instrument		N

E	ANNEX E, TEMPERATURE RISE OF A WINDING		P
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F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10)		N
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G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N
G.1	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)...		N
G.2.1	AC mains supply		N
G.2.2	DC mains supply		N
G.3	Determination of telecommunication network transient voltage (V)		N
G.4	Determination of required withstand voltage (V)		N
G.5	Measurement of transient levels (V)		N
G.6	Determination of minimum clearances		N

H	ANNEX H, IONIZING RADIATION		N
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J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		P
	Metal used		—

Cl.	Requirement - Test	Result - Remark	Verdict
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K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V) ...		N
K.3	Thermostat endurance test; operating voltage (V)		N
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation	(see appended table 5.3).	N

L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.1)		N
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N

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

Cl.	Requirement - Test	Result - Remark	Verdict
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N	ANNEX N, IMPULSE TEST GENERATORS (see 2.10.3.4, 6.2.2.1, 7.3.2 and clause G.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N

P	ANNEX P, NORMATIVE REFERENCES		N
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Q	ANNEX Q, BIBLIOGRAPHY		N
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R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6)		N
R.2	Reduced clearances (see 2.10.3)		N

S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N

T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N
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U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION		N
	See separate test report		N

Cl.	Requirement - Test	Result - Remark	Verdict
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1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
Enclosure	Bayer Thai Co Ltd	FR3005	V-0, min. 1.5 mm thick, 80°C.	UL 94	UL	
	Teijin Chemicals Ltd Research & Development Div	TN-7500#	V-1, min. 1.2mm thick, 60°C.	UL 94	UL	
PCB	--	--	min. V-1, min.105°C	UL 796	UL	
Speaker (Optional) (one provide)	--	--	8 ohm, 2 W	--	--	
Inverter	Foxconn	J19I006.01	I/P: Max. 13.2V, 3A. O/P: 825Vrms, 7.5mA.	--	--	
Transformer (AT1, BT1)	Taipei Multipower Electronics Co., Ltd.	SIT19150-1935	Class 130 °C	--	--	
H.V. Capacitor (AC7, AC8, AC9, BC7, BC8, BC9)	--	--	47pF, 3kV	--	--	
Mylar Sheet (Between metal enclosure & inverter bottom)	--	--	V-2 or better	UL 94	UL	
LCD Panel	LG	LM201U05	20.1", TFT type	--	--	

Cl.	Requirement - Test	Result - Remark	Verdict
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1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
Power Supply	Tamura Corporation	S39235K	I/P: 100-240Vac, 50/60Hz, 0.74-0.31A. O/P: +12V(A) / 1.2A; +12V(B) / 3A; +5V / 1.5A.	--	--	
AC Inlet/Noise Filiter (INLET1)	Delta Electronics Inc	03ME3G	250Vac, 3A X2: 0.1uF Y2: 2200pF*2	EN 60939-2/1988	VDE	
	High & Low Corporation	03SS2-PS	250Vac, 3A X2: 0.1uF Y2: 2200pF*2	EN 60939-2/1988	VDE	
Power Switch (SW1)	Alps Electric Co., Ltd	SDDJE Series	250 Vac, 10 A	EN 61058-1 VDE 0630	VDE	
Fuse (F1)	Littelfuse	215 Series	T2.5A, 250Vac	EN 60127-1 EN 60127-3	VDE	
Thermistor (TH1) (optional)	--	--	15 ohm at 25°C, 2A	--	--	
Varistor (VS1) (Optional)	Thinking Electronic Industrial Co Ltd	10471	250Vac	UL 1414	UL	
	Matsushita Electric Industrial Co Ltd Panasonic Corp Of North America	V10471U, V7471U	250Vac	UL 1449	UL	
Storage Capacitor (C9)	--	--	450V min., 56μF min., min. 105°C	--	--	
Transformer (T1) (Material Group I)	Tamura Corporation	TO-5736	Class B	--	--	
Insulation Tape used T1	Jingjiang Yahua Pressure Sensitive Glue Co Ltd	CT	130°C, CTI ≥ 600, CTI Material Group I.	UL 510 IEC 60112	UL	

Cl.	Requirement - Test	Result - Remark	Verdict
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1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
Margin Tape used T1	Teraoka Seisakusho Co Ltd	673FG	130°C, CTI $\geq$ 600, CTI Material Group I.	UL 510 IEC 60112	UL	
Transformer (T2)	Tamura Corporation	TO-5737	Class B	--	--	
Triple Wire used in T2	Furukawa Electric Wire Co., Ltd.	TEX-E	Class 130°C	EN 60950	VDE	
Line Choke (L3) (Optional)	Tokyo Parts	0R9A123K24Y	Class 105 °C	--	--	
Line Choke (L4) (Optional)	Hong Kok	301300H-278	Class 105 °C	--	--	
Line Choke (L5) (Optional)	Tamura	TO-9745	Class 130 °C	--	--	
- X-Capacitor (C4) (Optional)	Arcotronics	R46	Max. 0.22 μ F, min. 250V, 85°C	IEC 60384-14/1993	VDE	
	Matsushita	ECQUL	Max. 0.22 μ F, min. 250V, 85°C	IEC 60384-14/1993	VDE	
Bleeder Resister (R1, R2, R3)	--	--	390K Ω , 1/4W, SMD type	--	--	
Bridging Capacitor (C11, C31) (Optional) (Y1 Type)	TDK	CD	Max. 470 pF, min. 250V, 85°C	IEC 60384-14/1993	VDE	
	Murata	KX	Max. 470 pF, min. 250V, 85°C	IEC 60384-14/1993	VDE	
Bridge Diode (D1)	--	--	4A min, 600V min	--	--	
Photo Coupler (PHC1, PHC2, PHC3, PHC4)	NEC	PS2561A-1	di > 0.4 mm External/Internal Cl&Cr: >7/>4mm, 100°C min.	VDE 0884, IEC 60950	VDE	
Transistor (Q1)	--	--	5.76A min, 500V min	--	--	

Cl.	Requirement - Test	Result - Remark	Verdict
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1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/trademark	type/model	technical data	Standard	mark(s) of conformity ¹⁾	
PCB	--	--	min. V-1, min. 105°C	UL 796	UL	
Mylar Sheet (Between metal enclosure & power top)	--	--	V-2 or better	UL 94	UL	
Mylar Sheet (Between metal enclosure & power bottom)	--	--	V-2 or better	UL 94	UL	
¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance						

Cl.	Requirement - Test	Result - Remark	Verdict
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1.6.2	TABLE: electrical data (in normal conditions)					P
fuse #	I _{rated} (A)	U (V)	P (W)	I (A)	I _{fuse} (A)	Condition/status
F1	--	90V/50Hz	53.7	620	620	Maximum normal load.
F1	--	90V/60Hz	53.8	619	619	Ditto.
F1	0.68	100V/50Hz	53.6	544	544	Ditto.
F1	0.68	100V/60Hz	53.7	542	542	Ditto.
F1	0.29	240V/50Hz	53.6	237	237	Ditto.
F1	0.29	240V/60Hz	53.4	242	242	Ditto.
F1	--	254V/50Hz	53.3	226	226	Ditto.
F1	--	254V/60Hz	53.2	231	231	Ditto.
F1	--	264V/50Hz	53.3	220	220	Ditto.
F1	--	264V/60Hz	53.1	224	224	Ditto.

2.1.1.7	TABLE: discharge test (Fuse In)				P
Condition	Switch Position	τ calculated (s)	τ measured (s)	comments	
Line-Neutral	ON	0.42	0.317	Vo= 384 V 37% x Vo= 140.08 V V _{t=1sec} = 16 V	
Line-Neutral	OFF	--	0.952	Vo= 344 V 37% x Vo= 127.28 V V _{t=1sec} = 118 V	
EMI filter : CX=0.1uF					
Overall capacity: C4=0.22uF					
Discharge resistor: R1=R2=R3=390KΩ					

Cl.	Requirement - Test	Result - Remark	Verdict
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2.1.1.7	TABLE: discharge test (Fuse Out)				P
Condition	Switch Position	τ calculated (s)	τ measured (s)	comments	
Line-Neutral	ON	--	0.986	Vo= 342 V 37% x Vo= 126.54 V V _{t=1sec} = 122 V	
Line-Neutral	OFF	--	0.968	Vo= 344 V 37% x Vo= 127.28 V V _{t=1sec} = 116 V	
EMI filter : CX=0.1uF					

2.2.2	TABLE: Hazardous voltage (circuit) Measurement Test				
Transformer designation	Location	Maximum Voltage	Voltage Limiting Component	Comments	
T1	Pin7 – RTN	102Vpk	--	--	
		14.8Vdc	D16	Service for +12Vdc output, refer to table 2.2.2, 2.2.3, 2.2.4 for SELV Reliability Test.	
--	Pin10 – RTN	20Vpk	--	--	
T2	Pin6 – RTN	8.6Vpk	--	--	
--	Pin9 – RTN	40.3Vpk	--	--	
If the voltage exceeded 42.4 V pk or 60 V dc, the measurement was taken again after the next component in series with the secondary until the voltage measured was less than 42.4 V pk or 60 V dc.					
Each voltage measured and each component located in series directly before the measurement was noted.					

2.2.2, 2.2.3, 2.2.4	TABLE: SELV Reliability Test					P
Accessible Part (From to)	Voltage Limiting Component	Fault	Maxium Vpk/dc	Duration (ms)	Comments	
Output (+) to Output (-)	D16	Short	0	0.1	Unit shut down after 0.1 ms	
After the fault introduction, the voltage did not exceed 42.4 V pk or 60 V dc for longer than 0.2 seconds. In addition, a limit of 71 V pk or 120 V dc was not exceeded.						

Cl.	Requirement - Test	Result - Remark	Verdict
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2.4.2	TABLE: limit current circuit measurement					P
Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments	
normal condition:						
ACN1 pin1 – pin4	--	--	--	--	unit shutdown.	
ACN1 pin1 – Earth	--	--	--	--	unit shutdown.	
ACN1 pin4 – Earth	--	--	--	--	unit shutdown.	
AT1 pin7 – pin10	--	--	--	--	unit shutdown.	
AT1 pin7 - Earth	--	--	--	--	unit shutdown.	
AT1 pin10 - Earth	12.3	6.15	60.1	42.07		
single fault condition:						
ACN1 pin1 – pin4	--	--	--	--	AC7 short, unit shutdown.	
ACN1 pin1 – Earth	--	--	--	--	AC7 short, unit shutdown.	
ACN1 pin4 – Earth	--	--	--	--	AC7 short, unit shutdown.	
AT1 pin7 – pin10	--	--	--	--	AC7 short, unit shutdown.	
AT1 pin7 - Earth	--	--	--	--	AC7 short, unit shutdown.	
AT1 pin10 - Earth	--	--	--	--	AC7 short, unit shutdown.	
ACN1 pin1 – pin4	--	--	--	--	AC8 short, unit shutdown.	
ACN1 pin1 – Earth	--	--	--	--	AC8 short, unit shutdown.	
ACN1 pin4 – Earth	--	--	--	--	AC8 short, unit shutdown.	
AT1 pin7 – pin10	--	--	--	--	AC8 short, unit shutdown.	
AT1 pin7 - Earth	--	--	--	--	AC8 short, unit shutdown.	
AT1 pin10 - Earth	--	--	--	--	AC8 short, unit shutdown.	
ACN1 pin1 – pin4	--	--	--	--	AU1 pin4-5 short, unit shutdown.	
ACN1 pin1 – Earth	--	--	--	--	AU1 pin4-5 short, unit shutdown.	
ACN1 pin4 – Earth	--	--	--	--	AU1 pin4-5 short, unit shutdown.	
AT1 pin7 – pin10	--	--	--	--	AU1 pin4-5 short, unit shutdown.	
AT1 pin7 - Earth	--	--	--	--	AU1 pin4-5 short, unit shutdown.	
AT1 pin10 - Earth	--	--	--	--	AU1 pin4-5 short, unit shutdown.	
ACN1 pin1 – pin4	--	--	--	--	AU1 pin3-6 short, unit shutdown.	
ACN1 pin1 – Earth	--	--	--	--	AU1 pin3-6 short, unit shutdown.	
ACN1 pin4 – Earth	--	--	--	--	AU1 pin3-6 short, unit shutdown.	

Cl.	Requirement - Test	Result - Remark	Verdict
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2.4.2	TABLE: limit current circuit measurement				P
Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments
AT1 pin7 – pin10	--	--	--	--	AU1 pin3-6 short, unit shutdown.
AT1 pin7 - Earth	--	--	--	--	AU1 pin3-6 short, unit shutdown.
AT1 pin10 - Earth	--	--	--	--	AU1 pin3-6 short, unit shutdown.
Output measured with an 2 k Ω resistor as load.					

2.6.3.4	TABLE: ground continue test			P
Location	Resistant measured (Ω)		Comments	
Ground pin of AC inlet to Chassis	0.006		Test current=25A, 1min	
Ground pin of AC inlet to Chassis	0.009		Test current=40A, 2min	

Cl.	Requirement - Test	Result - Remark	Verdict
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2.10.2	TABLE: Max. working voltage measurement		
Location	Peak Voltage (V)	TRMS Voltage (V)	Comments
T1 (Pin1-7)	368	182	
T1 (Pin 1-10)	356	181	
T1 (Pin 2-7)	388	181	
T1 (Pin 2-10)	428	182	
T1 (Pin 4-7)	508	305	
T1 (Pin 4-10)	436	304	
T1 (Pin 5-7)	448	304	
T1 (Pin 5-10)	444	304	
T1 (Pin 6-7)	500	306	
T1 (Pin 6-10)	524	322	
T2 (Pin 1-6)	444	307	
T2 (Pin 1-9)	468	307	
T2 (Pin 2-6)	484	307	
T2 (Pin 2-9)	476	308	
T2 (Pin 3-6)	360	183	
T2 (Pin 3-9)	364	183	
T2 (Pin 4-6)	396	182	
T2 (Pin 4-9)	360	182	
T2 (Pin 5-6)	420	192	
T2 (Pin 5-9)	388	183	
C11 (1-2)	436	304	
C31 (1-2)	468	307	
PHC1 (3-1)	356	222	
PHC1 (3-2)	356	222	
PHC1 (4-1)	356	222	
PHC1 (4-2)	356	222	
PHC2 (3-1)	352	206	
PHC2 (3-2)	352	206	
PHC2 (4-1)	352	206	

Cl.	Requirement - Test	Result - Remark	Verdict
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2.10.2	TABLE: Max. working voltage measurement		
Location	Peak Voltage (V)	TRMS Voltage (V)	Comments
PHC2 (4-2)	352	206	
PHC3 (3-1)	364	186	
PHC3 (3-2)	364	186	
PHC3 (4-1)	356	222	
PHC3 (4-2)	356	222	
PHC4 (3-1)	360	176	
PHC4 (3-2)	360	176	
PHC4 (4-1)	340	200	
PHC4 (4-2)	340	200	
C12 primary pin and C31 secondary pin	376	194	
JW16 primary pin and C31 secondary pin	365	186	

Cl.	Requirement - Test	Result - Remark	Verdict
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2.10.3 and 2.10.4	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)
primary component (with 10N) →earthed trace or metal case	<420	<250	2.0	↓	2.5	↓
Pri. components to PE case (isolated by a mylar sheet)				>5.0		>5.0
primary traces→earthed trace or metal case	<420	<250	2.0	↓	2.5	↓
Under SW1				>4.4		>4.4
L to PE trace				>3.2		>3.2
Pri. traces to PE case (isolated by a mylar sheet between power board and metal case)				>6.0		>6.0
primary components (with 10N) →secondary components (with 10N)	<420	<250	4.0	↓	5.0	↓
H.S of Q1 to H.S of D17				>20		>20
pri. →sec. traces	<420	<250	4.0	↓	5.0	↓
under PHC1, PHC2, PHC3, PHC4				>6.0		>6.0
under C11				>5.7		>5.7
under C31				>5.9		>5.9
near C38				>5.7		>5.7
under T1	524	322	4.4	7.4	6.8	7.4
under T2	484	308	4.2	6.8	6.6	6.8
Between F1 two ends (basic insulation)	<420	<250	2.0	5.2	2.5	5.2
Between L and N	<420	<250	2.0	2.9	2.5	2.9
Note: 1. The CTI rating of PCB is material group IIIb (Cl. 2.10.4). 2. The CTI rating of transformer T1 is material group I (Cl. 2.10.4). 3. Separation Method between SELV and hazard circuit (Cl. 2.2.3) by double or reinforced insulation (Method 1). 4. Functional insulation shorted, see Cl. 5.3.4. 5. There is a gap under T2. 6. There is a mylar sheet located between Inverter top and metal case. 7. There is a mylar sheet located between power supply top and metal case. 8. There is a mylar sheet located between power bottom and metal case. 9. R33, R34, C25 and C10 are further cover with heat shrinkable tubing.						

Cl.	Requirement - Test	Result - Remark	Verdict
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2.10.5.1	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	> 0.4

Cl.	Requirement - Test	Result - Remark	Verdict
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4.5	TABLE: maximum temperatures		P
	test voltage (V)	90V/264V	—
	tamb1(°C)		—
	tamb2(°C)		—
Maximum temperature T of part/at:		T(°C)	AllowedTmax (°C)
AC inlet		30.3 30.9	57.7
L3 Coil (in power board)		45.1 45.1	92.7
L4 Coil (in power board)		53.1 53.1	92.7
C4 Body (in power board)		40.7 40.8	72.7
L5 Coil (in power board)		57.4 57.4	92.7
C9 Body (in power board)		44.9 43.3	92.7
PCB near TH1 (in power board)		61.2 61.2	92.7
PCB near D1 (in power board)		46.4 46.4	92.7
C31 Body (in power board)		51.7 51.7	72.7
C11 Body (in power board)		70.3 71.3	72.7
PCB near Q1 (in power board)		53.8 59.7	92.7
T1 Coil (in power board)		76.3 77.5	97.7
T1 Core (in power board)		70.7 71.9	97.7
T2 Coil (in power board)		58.2 58.3	97.7
T2 Core (in power board)		56.9 56.9	97.7
PHC1 Body (in power board)		59.1 60.1	92.7
PCB near D17 (in power board)		61.3 62.5	92.7
PCB near Q2 (in power board)		68.9 69.7	92.7
PCB near D16 (in power board)		68.6 69.6	92.7
C34 Body (in power board)		62.3 67.2	92.7
C5 Body (in power board)		49.2 49.3	72.7
AT1 Coil (in inverter board)		73.3 74.3	92.7
AT1 Core (in inverter board)		70.0 71.0	92.7
AL1 Coil (in inverter board)		53.3 54.2	92.7
AC1 Body (in inverter board)		59.6 60.7	92.7
PCB near U21 (in inverter board)		53.5 54.6	92.7

Cl.	Requirement - Test	Result - Remark	Verdict
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4.5	TABLE: maximum temperatures		P
	test voltage (V)	90V/264V	—
	tamb1(°C)		—
	tamb2(°C)		—
Maximum temperature T of part/at:		T(°C)	AllowedTmax (°C)
C701 Body (in main board)		38.6 39.9	92.7
IC401 Body (in main board)		64.4 65.0	92.7
IC601 Body (in main board)		54.7 56.1	92.7
Enclosure inside (near T1)		34.8 36.1	--
Enclosure outside (near T1)		30.9 32.3	82.7
Ambient		22.7 23.5	--

Cl.	Requirement - Test	Result - Remark	Verdict
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temperature rise T of winding:	$R_1 (\Omega)$	$R_2 (\Omega)$	T (°C)	required Tmax (°C)	insulation class
--	--	--	--	--	--
--	--	--	--	--	--

Comments:

The temperatures were measured by thermal couple (type T) method under worst case normal mode defined in 1.2.2.1 and as described in 1.6.2 at voltage described in 1.4.5. The worst case at normal mode is defined with max load of the adaptor.

With max. ambient temperature specified as 35°C, therefore, the maximum temperature rise is calculated as follows:

Winding components:

- class B $\rightarrow 120-10-(35-22.7)K = 97.7^\circ C$

Components with:

- max. absolute temp. of 70°C (AC inlet) $\rightarrow 70-(35-22.7) = 57.7^\circ C$
- max. absolute temp. of 105°C (Line choke) $\rightarrow 105-(35-22.7) = 92.7^\circ C$
- max. absolute temp. of 85°C (X cap) $\rightarrow 85-(35-22.7) = 72.7^\circ C$
- max. absolute temp. of 105°C (Electrolyte capacitor) $\rightarrow 105-(35-22.7) = 92.7^\circ C$
- max. absolute temp. of 115°C (PCB) $\rightarrow 105-(35-22.7) = 92.7^\circ C$

User accessible area:

- material is plastic (95°C) $\rightarrow 95-(35-22.7) = 82.7^\circ C$

Cl.	Requirement - Test	Result - Remark	Verdict
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4.6.1 & 4.6.2	TABLE: enclosure openings		P
Location	Size (mm)	Comments	
Plastic enclosure (external)			
Top side	9.7mm X 1.3mm	Several rectangular holes. Hazardous parts are not located within 5 degree of openings.	
	32.5mm X 1.4mm	Several rectangular holes. Hazardous parts are not located within 5 degree of openings.	
Right side	32.5mm X 1.4mm	Several rectangular holes. Hazardous parts are not located within 5 degree of openings.	
Left side	32.5mm X 1.4mm	Several rectangular holes. Hazardous parts are not located within 5 degree of openings.	
Bottom side	--	--	
Metal enclosure (Internal)			
Top side	Ø1.6mm	Several circle holes in internal metal enclosure.	
Right side	Ø1.6mm	Several circle holes in internal metal enclosure.	
Left side	Ø3.3mm	Several circle holes in internal metal enclosure.	
Bottom side	Ø1.6mm	Several circle holes in internal metal enclosure. Metal bottom min. 1.0 mm thick and max. diameter of holes not greater than 2.0mm.	

Cl.	Requirement - Test	Result - Remark	Verdict
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5.1	TABLE: touch current measurement			P
	Normal	The tests are repeated in reverse polarity		
Condition	Current (mA) L, N→PE	Current (mA) L, N→PE	Comments	
System ON	0.38	0.36		
System OFF	0.015	0.18		
Condition	Current (mA) L, N→SELV	Current (mA) L, N→SELV	Comments	
System ON	0.38	0.36		
System OFF	0.015	0.18		
Condition	Current (mA) L, N→Enclosure with foil	Current (mA) L, N→Enclosure with foil	Comments	
System ON	0.005	0.005		
System OFF	0.005	0.005		
Input voltage: 264V				
Input frequency: 60Hz				
Overall capacity: C11=C31=470pF				

5.2	TABLE: electric strength measurements		P
test voltage applied between:		test voltage (V)	breakdown
Primary and Secondary		DC 4242V	No
Primary and User accessible area		DC 4242V	No
Primary and Earth		DC 2549V	No
T1: Primary and Secondary		AC 3000V	No
T1: Primary and Core		AC 1803V	No
T1: Secondary and Core		AC 1803V	No
T2: Primary and Scondary		AC 3000V	No
T2: Core and Secondary		AC 3000V	Np
Insulation Tape (Teraoka Seisakusho Co., Ltd, type: 630F)		AC 3000V	No

Cl.	Requirement - Test	Result - Remark	Verdict
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5.3	TABLE: fault condition tests						P
	ambient temperature (°C)				25°C or see below		—
	model/type of power supply				See below		—
	manufacturer of power supply						—
	rated markings of power supply						—
No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
1.	D1 (AC - +)	S	240	< 1sec	F1	0.231→0	Fuse open immediately, no component damage, no hazards.
2.	C4	S	240	< 1sec	F1	0.231→0	Fuse open immediately, no component damage, no hazards.
3.	Q2 (D-G)	S	240	< 1sec	F1	0.231→0.02	Fuse open immediately, no component damage, no hazards.
4.	Q2 (D-S)	S	240	< 1sec	F1	0.231→0.02	Fuse open immediately, no component damage, no hazards.
5.	Q2 (G-S)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
6.	IC2 (pin2-pin5)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
7.	PCH1 (pin1)	O	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
8.	PCH2 (pin1)	O	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
9.	PCH3 (pin1)	O	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
10.	PCH4 (pin1)	O	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
11.	PCH1 (Pin3-4)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.

No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
12.	PCH2 (Pin3-4)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
13.	PCH3 (Pin3-4)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
14.	PCH4 (Pin3-4)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
15.	IC3 (Pin2-5)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
16.	D16	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
17.	D17	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
18.	R31	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
19.	T1 (Pin1-2)	S	240	< 1sec	F1	0.231→0.103	Unit shutdown immediately, IC2 damaged, no hazards.
20.	T1 (Pin7-10)	S	240	< 1sec	F1	0.231→0	Fuse open immediately, no component damage, no hazards.
21.	T2 (Pin6-9)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
22.	T2 (Pin4-5)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.
23.	T2 (Pin3-4)	S	240	10 min	F1	0.231→0.02	Unit shutdown immediately, no component damage, no hazards.

No.	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
24.	Overload in T1 (Pin7-10)	--	240V	7 hrs	F1	0.317→0.33→0.02	Temperature was stable at load 2.5A T1 coil=93.0°C T2 coil=58.1°C Ambient=26.2°C
25.	Overload in T2 (Pin6-9)	--	240V	7 hrs	F1	0.26→0.346→0.02	Temperature was stable at load 2.0A T1 coil=40.1°C T2 coil=56.5°C Ambient=24.3°C
26.	Ventilation Opening	Blocked	240V	3.5 hrs	F1	0.231	Unit operated normally, no component damaged, no hazards, T1 coil=86.5°C T2 coil=68.6°C Ambient=26.4°C

supplementary information

Fault: S = short circuit, O = open circuit

Note:

1. While fuse opened, same results came out for all sources of fuse.
2. While fuse opened, using UL approval fuse and fusible resistor that have to test for ten times and have the same results.
3. While unit shutdown with some component damaged, same results were carried out for two times.