

ELECTRICAL LABORATORY- TEST REPORT
Information technology equipment – Safety –
Part 1: General requirements

Test Report N°	██████████
Date of issue.....	██████
Sample date in.....	██████
Date of performance.....	██████████████████
Applicant.....	Mr. SAMPATH READDY
Customer.....	ACCORD POWER CONVERSION PVT. LTD.
	PLOT NO. C – 12/1, ELECTRONIC COMPLEX
	KUSHAIGUDA, HYDERABAD – 62,
	TELANGANA, INDIA
Sample description.....	AC-DC SMPS ADAPTOR
Sample Condition.....	OK
Customer reference.....	N/A

Trade mark / Manufacturer.....



Model / Type / Reference.....

Q10K050100/381600280

Ratings.....

I/P – 100-240 VAC, 0.2A, 47-63 Hz
O/P – 5.0VDC, 1.0A

Test method(s).....

IEC-60950-1:2005+A1:2009+A2:2013

Overall verdict

Pass



Fail



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Possible test case verdicts:

- Test case does not apply to the test object N/A
- Test object meets the requirement P (Pass)
- Test object does not meet the requirement F (Fail)

General remarks:

- “ See enclosure ## ” refers to additional information related to this report in the annexes section
- “ See table ## ” refers to a table appended to this report in the annexes section
- “ See figure ## ” refers to an image, picture or drawing appended to this report in the annexes section

General product information:

AC-DC SMPS ADAPTOR

Pictures of Specimen received:



Draft Test Report

[Redacted]

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COPY OF MARKING PLATE





Draft Test Report

Test Report

IEC 60950-1			
Clause no.	Requirement – Test	Results – Remarks	Verdict
1.5	Components		
1.5.1	GENERAL		
	Where safety is involved, components shall comply with the requirement of this standard.		P
1.5.2	Evaluation and testing of components	Refer Table 1	P
1.5.3	Thermal controls	No thermal controls	N/A
1.5.4	Transformers		P
1.5.5	Interconnecting cables	In compliance	N/A
1.5.6	Capacitors bridging insulation		N/A
1.5.7	Resistors bridging insulation		N/A
1.5.8	Components in equipment for IT power distribution systems		N/A
1.5.9	Surge suppressors		N/A
1.5.9.1	General		N/A
1.5.9.2	Protection of VDRs		N/A
1.5.9.3	Bridging of functional insulation by a VDR		N/A
1.5.9.4	Bridging of supplementary, double or reinforced insulation by a VDR		N/A
1.6	Power interface		
1.6.1	AC power distribution systems	TN, power system	N/A
1.6.2	Input current		
	The steady state input current of the equipment shall not exceed the RATED CURRENT by more than 10 % under NORMAL LOAD.	In Compliance	P
1.6.3	Voltage limit of hand-held equipment		
	The rated voltage of HAND-HELD equipment shall not exceed 250 V.	Direct Equipment Plug-in	N/A
1.6.4	Neutral conductor		P
1.7	Markings and instructions		
1.7.1	Power rating and Identification markings		
1.7.1.1	Power rating markings		
	The power rating marking shall include the following:		
-	Rated voltage(s) rated voltage range(s), in volts	100-240V AC	N/A
-	Symbol for nature of supply, for d.c only	Provided	P

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Clause no.	Requirement – Test	Results – Remarks	Verdict
-	Rated current, in milli-amperes or amperes	0.2 Amp	N/A
1.7.1.2	Identification markings		
	Equipment shall be provided by the following identification markings:		
	-manufacturer's name or trade-mark or identification mark;		P
	-manufacturer's model identification or type reference;	Q10K050100	P
	- Symbol, <input type="checkbox"/> for the identification of CLASS II equipment only, except where this is forbidden by 2.6.2.	In compliance	P
1.7.1.3	Use of graphical symbols		
	Graphical symbols placed on the equipment, whether required by this standard or not, shall be in accordance with IEC 60417 or ISO 3864-2 or ISO 7000,		P
	Symbols placed on the equipment shall be explained in the user manual.		P
1.7.2	Safety instructions and marking		
1.7.2.1	General		
1.7.2.2	Disconnect devices		
	Where the disconnect device is not incorporated in the equipment (see 3.4.3) or where the plug on the power supply cord is intended to serve as the disconnect device.		-
	- for permanently connected equipment, a readily accessible disconnect device shall be incorporated external to the equipment;		N/A
	- for pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible.		N/A
1.7.2.3	Over current protective devices		
	Pluggable equipment type B or permanently connected equipment, the installation instructions shall specify the maximum rating of an over current protective device to be provided external to the equipment		N/A
1.7.2.4	IT power distribution systems		
	If the equipment has been designed or, when required, modified for connection to an IT power distribution system, the equipment installation instructions shall so state.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
1.7.2.5	Operator access with a tool		
	If a tool is necessary to gain access to an operator access area, either all other compartments within that area containing a hazard shall be inaccessible to the operator by the use of the same tool,		N/A
	An acceptable marking for an electric shock hazard is  (ISO 3864, No. 5036)		N/A
1.7.2.6	Ozone		
	For equipment that may produce ozone, the installation and operating instructions shall refer to the need to take precautions to ensure that the concentration of ozone is limited to a safe value.		N/A
1.7.3	Short duty cycles		
	Equipment not intended for continuous operation shall be marked with its rated operating time and rated resetting time unless the operating time is limited by the construction.		N/A
1.7.4	Supply voltage adjustment		
	Equipment intended for connection to multiple rated voltages or frequencies, the method of adjustment shall be fully described in the servicing or installation instructions.		N/A
1.7.5	Power outlets on the equipment		
	If any standard power supply outlet in the equipment is accessible to the operator, a marking shall be placed in the vicinity of the outlet to show the maximum load that is permitted to be connected to it.		N/A
1.7.6	Fuse identification		
	Marking shall be located adjacent to each fuse or fuse holder, or on the fuse holder, or in another location provided that it		N/A
1.7.7	Wiring terminals		
1.7.7.1	Protective earthing and bonding terminals		
	A wiring terminal intended for connection of a protective earthing conductor shall be indicated by the symbol, IEC 60417- 5019		N/A
1.7.7.2	Terminals for a.c. mains supply conductors		
	Permanently connected and equipment with ordinary non- detachable power supply cords:		-
-	terminals intended exclusively for connection of the a.c. mains supply neutral conductor, if any, shall be indicated by the capital letter N;		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
-	on three-phase equipment, if incorrect phase rotation could cause overheating or other hazard, terminals intended for connection of the a.c mains supply line conductors shall be marked in such a way that, in conjunction with any installation instructions, the sequence of phase rotation is unambiguous.		N/A
1.7.7.3	Terminals for d.c, mains supply conductors		
	Permanently connected equipment and equipment with ordinary non- detachable power supply cords, terminals intended exclusively for connection of a d.c mains supply shall be marked to indicate polarity.		N/A
1.7.8	Controls and indicators		
1.7.8.1	identification, location and marking		-
	Markings and indications for switches and other controls shall be located either:		-
-	on or adjacent to the switch or control, or		N/A
-	Elsewhere, provided that it is obvious to which switch or control the marking applies.		N/A
1.7.8.2	Colours		
	safety is involved, colours of controls and indicators shall comply with IEC 60073. Where colours are used for functional controls or indicators, any colour, including red, is permitted provided that it is clear that safety is not involved,		N/A
1.7.8.3	Symbols		
	symbols are used on or near controls (for example, switches and push buttons) to indicate "ON" and "OFF" conditions, they shall be the line ■ for "ON" and circle ○ for "OFF" (IEC 60417-5007 (DB:2002-10)		N/A
	Use the symbols ○ and ■ to indicate the "OFF" and "ON" positions of any primary or secondary power switches, including isolating switches.		N/A
	A 'STAND-BY' condition shall be indicated by the symbol  (IEC 60417-5009 (DB:2002-10).		N/A
1.7.8.4	Markings using figures		
	If figures are used for indicating different positions of any control, the "OFF" position shall be indicated by the figure 0 (zero) and higher figures shall be used to indicate greater output, input, etc.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
1.7.9	Isolation of multiple power sources		N/A
1.7.10	Thermostats and other regulating devices		
	Thermostats and similar regulating devices intended to be adjusted during installation or in normal use shall be provided with an indication for the direction of adjustment to increase or decrease the value of the characteristic being adjusted. Indication by the symbols + and – is permitted.		N/A
1.7.11	Durability		
	Marking required by this standard shall be durable and legible.		P
1.7.12	Removable parts		
	Marking required by this standard shall not be placed on removable parts that can be replaced in such a way that the marking would become misleading.		P
1.7.13	Replaceable batteries		N/A
1.7.14	Equipment for restricted access locations		
	Equipment intended only for installation in a restricted access location, the installation instructions shall contain a statement to this effect.		N/A
2	Protection from hazards		
2.1	Protection from electric shock and energy hazards		
2.1.1	Protection in operator access areas		P
2.1.1.1	Access to energized parts		P
2.1.1.2	Battery compartments		N/A
2.1.1.3	Access to ELV wiring		N/A
2.1.1.4	Access to hazardous voltage circuit wiring		
	The insulation of internal wiring at hazardous voltage is accessible to an operator, or is not routed and fixed to prevent it from touching unearthed accessible conductive parts, it shall meet the requirements of 3.1.4 for double insulation or reinforced insulation.	No hazardous voltage present.	N/A
2.1.1.5	Energy hazards		
	There shall be no risk of injury due to an energy hazard in an operator access area.		P
2.1.1.6	Manual controls		
	Conductive shafts of operating shall not be connected to parts knobs, handles, levers and the like in operator access areas at hazardous voltages, to ELV circuits or to TNV circuits.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.1.1.7	Discharge of capacitors in equipment		
	Equipment shall be so designed that, at an operator - accessible external point of disconnection of a mains supply, the risk of electric shock from stored charge on capacitors connected in the equipment is reduced.		P
2.1.1.8	Energy hazards - d.c mains supplies		
-	Equipment shall be so designed that at an operator-accessible external point of disconnection of a DC mains supply		N/A
-	there is no hazardous energy level (for example, due to stored charge on a capacitor or a battery in the equipment, or to a redundant d.c mains supply for backup)		N/A
-	The hazardous energy level is removed within 2 s of the disconnection.		N/A
2.1.1.9	Audio amplifiers in information technology equipment	No audio amplifier found	N/A
2.1.2	Protection in service access areas		
	The requirements of 2.1.1.7 apply to all types of equipment and for permanently connected equipment, the time constant limit is 10 s. in addition, the requirements of 2.1.1.8 apply.		P
2.1.3	Protection in restricted access locations		
	Equipment to be installed in restricted access locations, the requirements for operator access area apply.		N/A
2.2	SELV circuits		
2.2.1	General requirements		
	SELV circuits shall exhibit voltages that are safe to touch both under normal operating conditions and after a single fault (see 1.4.14). If no external load is applied to the SELV current (open circuit), the voltage limits of 2.2.2 and 2.2.3 shall not be exceeded.		P
2.2.2	Voltages under normal conditions		
	a single SELV circuits or in interconnected SELV circuits, the voltage between any two conductors of the SELV circuit or circuits, and between any one such conductor and earth (see 1.4.9), shall not exceed 42,4 V peak, or 60 V d.c., under normal operating conditions.		P
2.2.3	Voltages under fault conditions		
	the event of a single fault (see 1.4.14), the voltages between any two conductors of the SELV circuit or circuits and between any one such conductor and earth (see 1.4.9) shall not exceed 42,4 V peak, or 60 V d.c.		P

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.2.4	Connection of SELV circuits to other circuits	Class II Equipment	N/A
	An SELV circuits is permitted to be connected to other circuits provided that, when the SELV circuit is so connected, all of the following conditions are met:		-
	- except as permitted by 1.5.7 and 2.4.3, the SELV circuit is separated by basic insulation from any primary circuit (including the neutral) within the equipment;		N/A
	- the SELV circuit meets the limits of 2.2.2 under normal operating conditions;		N/A
	- except as specified in 2.3.2.1 b), the SELV circuit meets the limits of 2.2.3 in the event of a single fault (see 1.4.14) in the SELV circuits or in the secondary circuits to which the SELV circuit is connected.		N/A
2.3	TNV circuits		
2.3.1	Limits		
	In a single TNV circuit or interconnected TNV circuit, the voltage between any two conductors of the TNV circuit or circuit and between any one such conductor and earth (see 1.4.9) shall comply with the following:	No TNV circuit in the equipment.	-
a)	TNV-1 circuits		N/A
b)	TNV-2 circuits and TNV-3 circuits		N/A
2.3.2	Separation of TNV circuits from other circuits and from accessible parts		N/A
2.3.2.1	General requirement		N/A
2.3.2.2	Protection by basic insulation		N/A
2.3.2.3	Protection by earthing		N/A
2.3.2.4	Protection by other construction		N/A
2.3.3	Separation from hazardous voltages		
	Except as permitted in 2-3.4, a TNV circuit shall be separated from circuits at hazardous voltage by one or more of the constructions specified in 2.9.4.		N/A
2.3.4	Connection of TNV circuits to other circuits		
	Except as permitted in 1.5.7, a TNV circuit is permitted to be connected to other circuits, provided that it is separated by basic insulation from any primary circuit (including the neutral) within the equipment.		N/A
2.3.5	Test for operating voltages generated externally		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.4	Limited current circuits		
2.4.1	General requirements		
	Limited current circuits shall be so designed that the limits specified in 2.4.2 are exceeded under normal operating conditions and in the event of a single failure within equipment (see 1.4.14 and 1.5.7).		N/A
2.4.2	Limit values		
	For frequencies not exceeding 1 kHz, the steady-state current drawn through a non-inductive resistor of $2000\Omega \pm 10\%$ connected between any two parts of a limited current circuit.		N/A
2.4.3	Connection of limited current circuits to other circuits		
	Limited current circuits are permitted to be supplied from or connected to other circuits, provided that the following conditions are met:		-
-	The Limited current circuit meets the limits of 2.4.2 under normal operating conditions;		N/A
-	The Limited current circuit continues to meet the Limits of 2.4.2 in the event of a single failure of any component or insulation in the Limited current circuit, or of any component or insulation in the other circuit to which it is connected.		N/A
2.5	Limited power sources		
	A limited power source shall comply with one of the following, a), b), c) or d):		
a)	the output is inherently limited in compliance with Table 2B;		N/A
b)	a linear or non-linear impedance limits the output in compliance with Table 2B		N/A
c)	a regulating network, or an integrated circuit (IC) current limiter, limits the output in compliance with Table 2B		P
d)	an over current protective device is used and the output is limited in compliance with Table 2C		N/A
2.6	Provisions for earthing and bonding		
2.6.1	Protective earthing	Class II equipment.	N/A
2.6.2	Functional earthing		
	If functional earthing of accessible conductive parts is necessary all of the following apply to the functional earthing circuit:		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.6.3	Protective earthing conductors and protective bonding conductors		
2.6.3.1	General		
	Protective earthing conductors and Protective bonding conductors shall have sufficient current-carrying capacity.		N/A
2.6.3.2	Size of protective earthing conductors		
	Protective earthing conductors in power supply cords supplied with the equipment shall comply with the minimum conductor sizes in Table 3B (see 3.2.5).		N/A
2.6.3.3	Size of protective bonding conductors		
	Protective bonding conductors shall comply with one of the following:		-
-	the minimum conductor sizes in Table 3B (see 3.2.5);		N/A
-	the requirements of 2.6.3.4 and also, if the Protective current rating more than 16 A, with the minimum conductor sizes in Table 2D		N/A
-	for components only, be not smaller than the conductors supplying component.		N/A
2.6.3.4	Resistance of earthing conductors and their terminations		
	Earthing conductors and their terminations shall not have excessive resistance		N/A
2.6.3.5	Colour of insulation		
	The insulation of the protective earthing conductor in a power supply cord supplied with the equipment shall be green-and-yellow.		N/A
2.6.4	Terminals		
2.6.4.1	General		
2.6.4.2	Protective earthing and bonding terminals		
	Equipment required to have protective earthing shall have a main protective earthing terminal.		N/A
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		
	Separate wiring terminals, which may be on the same bus bar, shall be provided, one for the protective earthing conductor		N/A
2.6.5	Integrity of protective earthing		
2.6.5.1	Interconnection of equipment		
	A system of interconnected equipment, the protective earthing connection shall be ensured for all equipment requiring a protective earthing connection, regardless of the arrangement of equipment in the system.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		
	Protective earthing conductors and protective bonding conductors shall not contain switches or over current protective devices.	Class II Equipment	N/A
2.6.5.3	Disconnection of protective earth		
	Protective earthing connections shall be such that disconnection of a protective earth at one point in a unit or a system does not break the protective earthing connection to other parts or units in a system, unless the relevant hazard is removed at the same time.		N/A
2.6.5.4	Parts that can be removed by an operator		
	Protective earthing connections shall make earlier and break later than the supply connections in each of the following:		-
-	the connector of a part that can be removed by an operator;		N/A
-	a plug on a power supply cord;		N/A
-	an appliance coupler.		N/A
2.6.5.5	Parts removed during servicing		
	Protective earthing connections shall be so designed that they do not have to be disconnected for servicing other than for the removal of the part that they protect unless the relevant hazard is removed at the same time.		N/A
2.6.5.6	Corrosion resistance		
	Conductive parts in contact at protective earthing and protective bonding terminals and connections shall not be subject to significant corrosion due to electrochemical action in any working, storage or transport environment conditions as specified in the instructions supplied with the equipment.		N/A
2.6.5.7	Screws for protective bonding		
	Self-tapping (thread-cutting and thread-forming) and spaced thread (sheet metal) screws are permitted to provide protective bonding but it shall not be necessary to disturb the connection during servicing.		N/A
2.6.5.8	Reliance on telecommunication network or cable distribution system		
	Protective earthing shall not rely on a telecommunication network or cable distribution system		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.7	Over current and earth fault protection in primary circuits		
2.7.1	Basic requirements		
	Protection in primary circuits against over currents, short-circuits and earth faults shall be provided, either as an integral part of the equipment or as part of the building installation.		N/A
2.7.2	Faults not simulated in 5.3.7		
	Protection against faults not simulated in 5.3.7 (for example, short-circuits to protective earth from wiring in a primary circuit) need not be fitted as an integral part of the equipment		N/A
2.7.3	Short-circuit backup protection		
	short-circuit backup protection is provided, protective devices shall have adequate breaking (rupturing) capacity to interrupt the maximum fault current (including short circuit current) which can flow.		N/A
2.7.4	Number and location of protective devices		
	Protective systems or devices in primary circuits shall be in such a number and located so as to detect and to interrupt the over current flowing in any possible fault current path (for example, line-to-line, line-to-neutral, line to protective earth conductor or line to protective bonding conductor).		N/A
2.7.5	Protection by several devices		
	Protective devices are used in more than one pole of a supply to a given load, those devices shall be located together. it is permitted to combine two or more protective devices in one component.		N/A
2.7.6	Warning to service persons		
	Suitable marking shall be provided on the equipment or a statement shall be provided in the servicing instructions to alert a service person to a possible hazard, where both of the following conditions exist:		-
-	fuse is used in the neutral of single-phase equipment either permanently connected or provided with a non-reversible plug;		N/A
-	After operation of the fuse, parts of the equipment that remain energized might represent a hazard during servicing.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.8	Safety interlocks	No safety interlocks	
2.8.1	General principles		
	Safety interlocks shall be provided where operator access involves area normally presenting hazards in the meaning of the standard		N/A
2.8.2	Protection requirements		
	Safety interlocks shall be so designed that the hazard will be removed before the covers, doors, etc., are in any position that will permit contact with hazardous parts by the test finger.		N/A
2.8.3	Inadvertent reactivation		
	Safety interlocks shall be designed so that inadvertent reactivation of the hazard cannot occur when covers, guards, doors, etc., are not in the closed position.		N/A
2.8.4	Fail-safe operation		
	A Safety interlocks system shall be so designed and constructed that either:		-
-	a failure of the Safety interlocks system during the normal life of the equipment is not likely to occur and, even if a failure should occur, it shall not create an extreme hazard;		N/A
-	a failure of the Safety interlocks system during the normal life of the equipment is possible, the probable failure mode (s) will not create a hazard for which protection is required.		N/A
2.8.5	Moving parts		
	Moving mechanical parts in mechanical and electromechanical Safety interlock systems shall have adequate endurance.		N/A
2.8.6	Overriding		
	It may be necessary for a service person to override a Safety interlock, the override system shall comply with all of the following:		-
-	require an intentional effort to operate		N/A
-	reset automatically to normal operation when servicing is complete, or prevent normal operation unless the service person has reset the Safety interlock;		N/A
-	require a tool for operation when in an operator access area and not be operable with the test finger, Figure 2A		N/A
-	not bypass a safety interlock for an extreme hazard unless another reliable means of safety protection becomes effective when the Safety interlock is thus bypassed.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.8.7	Switches, relays and their related circuits		
	A switch in a Safety interlock system shall:		
-	conform to IEC 61058-1, with evaluation for 10000 operating cycles in accordance with 7.1.4.4 of IEC 61058-1;		N/A
-	comply with 2.8.7.1 and pass the tests of 2.8.7.3 and 2.9.7.4		N/A
-	pass the tests of 2.8.7.2, 2.8.7.3 and 2.8.7.4.		N/A
2.8.7.1	Separation distances for contact gaps and their related circuits		N/A
2.8.7.2	Overload test		N/A
2.8.7.3	Endurance test		N/A
2.8.7.4	Electric strength test		N/A
2.8.8	Mechanical actuators		
	the actuating part in a mechanical Safety interlock system is relied upon for safety, precautions shall be taken to ensure that it is not overstressed		N/A
2.9	Electrical insulation		
2.9.1	Properties of insulating materials		P
2.9.2	Humidity conditioning		P
	Relative humidity (%), temperature (°C).....	Tested for 48hrs at 93% R.H, 25 °C.	P
2.9.3	Grade of insulation		
	Insulation shall be considered to be functional insulation, basic insulation. Supplementary insulation, reinforced insulation or double insulation	Double insulation	P
2.9.4	Separation from hazardous voltages		
	Accessible conductive parts, including SELV Circuit, TNV Circuits and their related windings, are separated from parts at Hazardous voltage.		P
2.10	Clearances, creepage distances and distances through insulation		
2.10.1	General		P
2.10.1.1	Frequency	47-63 Hz	P
2.10.1.2	Pollution degrees	Pollution degrees 2	P
2.10.1.3	Reduced values for functional insulation		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.10.1.4	intervening unconnected conductive parts		
	It is permitted for clearances and creepage distances to be divided by intervening, unconnected (floating) conductive parts, such as unused contacts of a connector.		N/A
2.10.1.5	Insulation with varying dimensions		
	If the insulation of a transformer has different working voltages along the length of the winding, it is permitted to vary clearances, creepage distances and distances through insulation accordingly.		N/A
2.10.1.6	Special separation requirements		
	The requirements of 2.10 and Annex G do not apply to separation provided to comply with 2.3.2 unless basic insulation is used, nor to separation provided to comply with 6.1.2 or 6.2.1.		N/A
2.10.1.7	Insulation in circuits generating starting pulses		
	For a circuit generating starting pulses to ignite a discharge lamp, and if the circuit is a limited current circuit complying with 2.4, the requirements for functional insulation apply between the circuit and other conductive parts (see 5.3.4).		N/A
2.10.2	Determination of working voltage		
2.10.2.1	General		
2.10.2.2	RMS working voltage	230.9 Vrms	P
2.10.2.3	Peak working voltage	325.8 VpK	P
2.10.3	Clearances		
2.10.3.1	General		
	CLEARANCES shall be so dimensioned that over voltages, including transients that may enter the equipment, and peak voltages that may be generated within the equipment, do not break down the clearance.		P
2.10.3.2	Mains transient voltages		
	a) Ac mains supply		P
	b) Earthed Dc mains supply		N/A
	c) Unearthed Dc mains supply		N/A
	d) Battery operation		N/A
2.10.3.3	Clearances in primary circuits	See table below	P
2.10.3.4	Clearances in secondary circuits		N/A
	Minimum CLEARANCES in secondary circuits are determined from Table 2M.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.10.3.5	Clearances in circuits having starting pulses		
	a circuit generating starting pulses to ignite a discharge lamp, and if the circuit is not a Limited current circuit complying with 2.4		N/A
2.10.3.6	Transients from an a.c mains supply	See sub clause 2.10.3.2	P
2.10.3.7	Transients from a d.c. mains supply		N/A
2.10.3.8	Transients from telecommunication networks and cable distribution systems		
	If the telecommunication network Transient voltage is known for the telecommunication network in question, it is permitted to use the known value in 2.10.3.4.		N/A
2.10.4	Creepage distances		
2.10.4.1	General		
	Creepage distances shall be so dimensioned that, for a given RMS working voltage and pollution degree, no flashover or breakdown of insulation (for example, due to tracking) will occur.		P
2.10.4.2	Material group and comparative tracking index	Material Group IIIb shall be assumed.	P
2.10.4.3	Minimum creepage distances		
	Creepage distances shall be not less than the appropriate minimum values specified in Table 2N.	See table below	P
2.10.5	Solid insulation		
	the requirements for Solid insulation (except those for thin sheet material) and for insulating compound also apply to gel materials		P
2.10.5.2	Distances through insulation		
	If a design is based on distances through insulation. these distances shall be dimensioned according to the application of the insulation (see 2.9) and as follows (see Figure F.14):		P
2.10.5.3	insulating compound as solid insulation		
	There is no minimum internal clearance or creeage distance if insulating compound completely fills the casing of a component or subassembly, provided that each distance through insulation in the component or subassembly meets the requirements of 2.10.5.2 and a single sample passes the tests of 2.10.10.		P

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.10.5.4	Semiconductor devices		
	There is no minimum distance through insulation for supplementary insulation or Reinforced insulation consisting of an insulating compound completely filling the casing of a semiconductor component		N/A
2.10.6	Construction of printed boards		
2.10.6.1	Uncoated printed boards		
	The insulation between conductors on the outer surfaces of an uncoated printed board shall comply with the minimum CLEARANCE requirements of 2.10.3 (or Annex G) and the minimum creepage distance requirements of 2.10.4.		N/A
2.10.6.2	Coated printed boards		
	For printed boards whose outer surfaces are to be coated with a suitable coating material,		P
2.10.6.3	insulation between conductors on the same inner surface of a printed board		
	Inner surface of a multi-layer printed board (see Figure F.16), the path between any two conductors shall comply with the requirements for a cemented joint in 2.10.5.5		N/A
2.10.7	Component external terminations		
	It is permitted to use coatings over external terminations of components to increase effective clearances and creepage distances (see Figure F.10).		N/A
2.10.8	Tests on coated printed boards and coated components		
2.10.8.1	Sample preparation and preliminary inspection		
	Three sample printed boards (or, for coated components in 2.10.7, two components and one board) identified as samples 1, 2 and 3 are required. It is permitted to use either actual boards or specially produced samples with representative coating and minimum separations.		N/A
2.10.8.2	Thermal conditioning		
	Sample 2 is aged in a full draught oven at a temperature and for a time duration chosen from the graph of Figure 2J using the temperature index line that corresponds to the maximum operating temperature of the coated board		N/A
2.10.8.3	Electric strength test		
	Samples 1 and 2 (see 2.10.8.1) are then subjected to the humidity conditioning of 2.9.2 and shall withstand the relevant electric strength test of 5.2.2 between conductors.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
2.10.8.4	Abrasion resistance test		
	Scratches are made across five pairs of conducting parts and the intervening separations at points where the separations will be subject to the maximum potential gradient during the tests.		N/A
2.10.9	Thermal cycling		
	The following thermal cycling sequence is used if required by 2.10.8.2, 2.10.10 or 2.10.11.		N/A
2.10.10	Test for Pollution Degree 1 environment and for insulating compound		N/A
2.10.11	Tests for semiconductor devices and for cemented joints		N/A
2.10.12	Enclosed and sealed parts		N/A
3	Wiring, connections and supply		
3.1	General		
3.1.1	Current rating and over current protection		
	The cross-sectional area of internal wires and interconnected cables shall be adequate for the current they are intended to carry when the equipment is operating under normal load		P
3.1.2	Protection against mechanical damage		
	Wire ways shall be smooth and free from sharp edges. wires shall be protected so that they do not come into contact with burrs, cooling fins, moving parts, etc	Wire way is smooth and free from sharp edges.	P
3.1.3	Securing of internal wiring		
	internal wiring shall be routed, supported, clamped or secured in a manner that reduces the likelihood of:		-
-	excessive strain on wire and on terminal connections; and		P
-	loosening of terminal connections; and		P
-	damage of conductor insulation.		P
3.1.4	Insulation of conductors		
	Except as covered in 2.1.1.3 b), insulation of individual conductors of internal wiring shall fulfill the requirements of 2.10.5 and be capable of withstanding the applicable electric strength test specified in 5.2.2.	The insulation of individually conductors is suitable for the application	P
3.1.5	Beads and ceramic insulators		
-	Beads and similar ceramic insulators on conductors shall:	No beads or similar ceramic insulators on conductors.	
-	be so fixed or supported that they cannot change their position in such a way that a hazard would be created		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
-	not rest on sharp edges or sharp corners.		N/A
3.1.6	Screws for electrical contact pressure		
	Electrical contact pressure is required, a screw shall engage at least two complete threads into a metal plate, a metal nut or a metal insert.		N/A
3.1.7	Insulating materials in electrical connections		
	Electrical connections, including those for protective earthing functions (see 2.6), shall be so designed that contact pressure is not transmitted through insulating material unless there is sufficient resilience in the metallic parts to compensate for any possible shrinkage or distortion of the insulating material.	No contact pressure through insulating material	P
3.1.8	Self-tapping and spaced thread screws		
	Spaced thread (sheet metal) screws shall not be used for the connection of current-carrying parts, unless they clamp these parts directly in contact with each other and are provided with a suitable means of locking.		N/A
3.1.9	Termination of conductors		
	It is permitted to use soldered, welded, crimped, screwless (push-In) and similar terminations for the connection of conductors. For soldered terminations, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering alone to maintain The conductor in position.	All conductors are reliably secured	P
	10 N pull test	During this test no hazard occurred through conductors	P
3.1.10	Sleeving on wiring		
	Sleeving is used as supplementary insulation on internal wiring, it shall be retained in position by positive means.		P
3.2	Connection to a mains supply		
3.2.1	Means of connection		
3.2.1.1	Connection to an a.c mains supply		
	For safe and reliable connection to an AC mains supply, equipment shall be provided with one of the following:		-
	- terminals for permanent connection to the supply;		N/A
	- a non-detachable Power supply cord for permanent connection to the supply, or for connection to the supply by means of a plug;		N/A
	- an appliance inlet for connection of a detachable power supply cord:		N/A
	- a mains plug that is part of direct plug-in equipment .		P

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Clause no.	Requirement – Test	Results – Remarks	Verdict
3.2.1.2	Connection to a d.c. mains supply		
	For safe and reliable connection to a d.c mains supply, equipment shall be provided with one of the following:		-
	- terminals for permanent connection to the supply;		N/A
	- a non-detachable power supply cord for permanent connection to the Supply, or for connection to the supply by means of a plug;		N/A
	- an appliance inlet for connection of a detachable power supply cord.		N/A
3.2.2	Multiple supply connections		
	If equipment is provided with more than one supply connection (for example, with different voltages or frequencies or as backup power), the design shall be such that all of the following conditions are met:		N/A
	- separate means of connection are provided for different circuits; and		N/A
	- supply plug connections, if any, are not interchangeable if a hazard could be created by incorrect plugging; and		N/A
	- bare parts of an ELV circuit or parts at hazardous voltages, such as plug contacts, are not accessible to an operator when one or more connectors are disconnected.		N/A
3.2.3	Permanently connected equipment		
	Permanently connected equipment shall be provided with either:		-
	- a set of terminals as specified in 3.3; or		N/A
	- a non-detachable power supply cord.		N/A
3.2.4	Appliance inlets		
	Appliance inlets shall meet all of the following:		-
-	be so located or enclosed that parts at hazardous voltage are not accessible insertion or removal of the connector (appliance inlets complying with IEC 60309 IEC 60320 are considered to comply with this requirement); and		N/A
-	be so located that the connector can be inserted without difficulty; and		N/A
-	be so located that, after insertion of the connector, the equipment is not supported by the connector for any position of normal use on a flat surface.		N/A
3.2.5	Power supply cords		
3.2.5.1	AC power supply cords		
	A mains supply cord shall be of the sheathed type and comply with the following as appropriate:		-

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Clause no.	Requirement – Test	Results – Remarks	Verdict
-	if rubber sheathed, be of synthetic rubber and not lighter than ordinary tough rubber-sheathed flexible cord according to IEC 60245-1 (designation 60245 IEC 53):		N/A
-	if PVC sheathed:		N/A
	. for equipment provided with a non-detachable Power supply cord and having a mass not exceeding 3 kg, be not lighter than light pvc sheathed flexible cord according to IEC 60227-1:2007		N/A
	. for equipment provided with a non-detachable Power supply cord and having a mass exceeding 3 kg, be not lighter than ordinary pvc sheathed flexible cord according to IEC 60227-1:2007		N/A
	. for equipment provided with a detachable power supply cord, be not lighter than light pvc sheathed flexible cord according to IEC 60227 -1.2007		N/A
	for screened cords of moveable equipment, the flexing test of 3.1 of IEC 60227 -2:1997;		N/A
3.2.5.2	DC power supply cords		
	A power supply cord for connection to the d.c mains supply shall be suitable for the voltage, current and the physical abuses it is likely to encounter.		N/A
3.2.6	Cord anchorages and strain relief		
	For equipment with a non-detachable Power supply cord, a cord anchorage shall be supplied such that		-
-	the connecting points of the cord conductors are relieved from strain, and		N/A
-	the outer covering of the cord is protected from abrasion.		N/A
3.2.7	Protection against mechanical damage		
	Power supply cords shall not be exposed to sharp points or cutting edges within or on the surface of the equipment, or at the inlet opening or inlet bushing.		N/A
3.2.8	Cord guards		
	A cord guard shall be provided at the power supply cord inlet opening of equipment that has a non-detachable Power supply cord, and which is hand-held equipment or is intended to be moved while in operation.		N/A
3.2.9	Supply wiring space		
	The supply wiring space provided inside, or as part of, the equipment for permanent connection or for connection of an ordinary non-detachable power supply cord.		N/A
3.3	Wiring terminals for connection of external conductors	No external connection required	
3.3.1	Wiring terminals		

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Clause no.	Requirement – Test	Results – Remarks	Verdict
	Permanently connected equipment and equipment with ordinary non-detachable power supply cords shall be provided with terminals in which connection is made by means of screws, nuts or equally effective devices (see also 2.6.4).		N/A
3.3.2	Connection of non-detachable power supply cords		
	For equipment with special non-detachable power supply cords, the connection of the individual conductors to the internal wiring of the equipment shall be accomplished by any means that will provide a reliable electrical and mechanical connection without exceeding the permitted temperature limits while the equipment is operated under normal load(see also 3.1.9).		N/A
3.3.3	Screw terminals		
	Screws and nuts that clamp external mains supply conductors shall have a thread conforming to ISO 261 or ISO 262.		N/A
3.3.4	Conductor sizes to be connected		
	Terminals shall allow the connection of conductors having nominal cross-sectional areas as shown in Table 3D.		P
3.3.5	Wiring terminal sizes		
	Pillar, stud or screw type terminals shall comply with the minimum sizes in Table 3E.		N/A
3.3.6	Wiring terminal design		
	Wiring terminals shall be so designed that they clamp the conductor between metal surfaces with sufficient contact pressure and without damage to the conductor.		N/A
3.3.7	Grouping of wiring terminals		
	For ordinary non-detachable power supply cords and for permanently connected equipment, all associated a.c mains supply terminals shall be located in proximity to each other and to the main protective earthing terminal.		N/A
3.3.8	Stranded wire		
	The end of a stranded conductor shall not be consolidated by soft soldering at places where the conductor is subject to contact pressure unless the method of clamping is designed so as to reduce the likelihood of a bad contact due to cold flow of the solder.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
3.4	Disconnection from the mains supply		
3.4.1	General requirement		
	A disconnect device or devices shall be provided to disconnect the equipment from the mains supply for servicing.	Direct plug in Equipment	N/A
3.4.2	Disconnect devices		
	equipment intended to be powered from an a.c mains supply that is Overvoltage Category I, Overvoltage Category II or Overvoltage Category III, or from a d.c mains supply that is at a hazardous voltage, a disconnect device shall have a contact separation of at least 3 mm.		N/A
3.4.3	Permanently connected equipment		
	For Permanently connected equipment, the disconnect device shall be incorporated in the equipment, unless the equipment is accompanied by installation instructions in accordance with 1.7.2.1, stating that an appropriate disconnect device shall be provided external to the equipment.		N/A
3.4.4	Parts which remain energized		
	Parts on the supply side of a disconnect device in the equipment which remain energized when the disconnect device is switched off shall be guarded so as to reduce the likelihood of accidental contact by a service person.		N/A
3.4.5	Switches in flexible cords		
	Isolating switches shall not be fitted in flexible cords.		N/A
3.4.6	Number of poles-single-phase and d.c, equipment		
	A disconnect device, if provided in or as part of the equipment, shall disconnect both poles simultaneously		N/A
3.4.7	Number of poles - three-phase equipment		
	For three-phase equipment, the disconnect device shall disconnect simultaneously all line conductors of the a.c mains supply		N/A
3.4.8	Switches as disconnect devices		
	The disconnect device is a switch incorporated in the equipment, its "ON" and "OFF" positions shall be marked in accordance with 1.7.8.		N/A
3.4.9	Plugs as disconnect devices		
	Where a plug on the power supply cord is used as the disconnect device. The installation instructions shall comply with 1.7.2.1.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
3.4.10	Interconnected equipment		
	A disconnect device shall be provided to disconnect hazardous parts likely to be contacted while the unit under consideration is being serviced, unless these parts are guarded and marked with appropriate warning labels		N/A
3.4.11	Multiple power sources		
	A unit receives power from more than one frequencies or as backup power), there shall be device giving adequate instructions for the removal source (for example, different voltages or a prominent marking at each disconnect of all power from the unit.		N/A
3.5	Interconnection of equipment		
3.5.1	General requirements		
	An equipment is intended to be electrically connected to another equipment, to an accessory or to a telecommunication network, interconnection circuits shall be selected to provide continued conformance to the requirements of 2.2 for SELV circuits, and with the requirements of 2,3 for TNV circuits, after making connections.		N/A
3.5.2	Types of interconnection circuits		
	Each interconnection circuit shall be one of the following types:		-
	- an SELV circuit or a limited current circuit; or		N/A
	- a TNV-1 circuit. TNV-2 circuit or TNV-3 circuit; or		N/A
	- a hazardous voltage circuit.		N/A
3.5.3	ELV circuits as interconnection circuits		
	Additional equipment is specifically complementary to the host (first) equipment (for example, a collator for a copying machine) ELV circuits are permitted as interconnection circuits between the equipments, provided that the equipments continue to meet the requirements of this standard when connected together.		N/A
3.5.4	Data ports for additional equipment		
	Limit the risk of fire in an additional equipment or accessory (for example, a scanner, mouse, keyboard, DVD drive, CD ROM drive or joystick), SELV circuits of a data port for connection of such equipment shall be supplied by a limited power source that complies with 2.5. This requirement does not apply if it is known that the additional equipment complies with 4.7.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
4	Physical requirements		
4.1	Stability		
	Under conditions of normal use, units and equipment shall not become physically unstable to the degree that they could become a hazard to an operator or to a service person.		N/A
4.2	Mechanical strength		
4.2.1	General		
	Equipment shall have adequate mechanical strength and shall be so constructed that no hazard is created in the meaning of this standard when subjected to handling as may be expected.		P
4.2.2	Steady force test, 10 N		
	Components and parts, other than parts serving as an enclosure (see 4.2.9 and 4.2.4), are subjected to a steady force of 10 N ±1 N.		P
4.2.3	Steady force test, 30 N		
	Parts of an enclosure located in an operator access area, which are protected by a cover or door meeting the requirements of 4.2.4, are subjected to a steady force of 30 N ±3 N for a period of 5 s, applied by means of a straight unjointed version of the test finger.		P
4.2.4	Steady force test, 250 N		
	External enclosures are subjected to a steady force of 250N±10N for a period of 5s, applied in turn to the top, bottom and sides of the enclosure fitted to the equipment, by means of a suitable test tool providing contact over a circular plane surface 30 mm in diameter. However, this test is not applied to the bottom of an enclosure of equipment having a mass of more than 18 kg.		N/A
4.2.5	Impact test		
	Except for equipment identified in 4.2.6, external surfaces of enclosures, the failure of which would give access to hazardous parts,		N/A
4.2.6	Drop test		
	The following equipment is subjected to a drop test:		
-	Hand- held equipment;		N/A
-	Direct plug in equipment;		P
-	Transportable equipment;		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
-	desktop equipment having a mass of 5 kg or less that is intended for use with any one of the following:		N/A
-	a cord-connected telephone handset, or		N/A
-	another cord-connected hand-held accessory with an acoustic function, or		N/A
-	a headset:		N/A
-	Movable equipment requiring lifting or handling by the user as part of its intended use.		N/A
4.2.7	Stress relief test		
	Enclosures of molded or formed thermoplastic materials shall be so constructed that any shrinkage or distortion of the material due to release of internal stresses caused by the molding or forming operation does not result in the exposure of hazardous parts or in the reduction of clearances or creepage distances below the values specified in 2.10		N/A
4.2.8	Cathode ray tubes		
	If a cathode ray tube having a maximum face dimension exceeding 160 mm is included in the equipment, either the cathode ray tube or the enclosure with the cathode ray tube correctly installed shall comply with the requirements of clause 18 of IEC 60065 for mechanical strength of cathode ray tubes.		N/A
4.2.9	High pressure lamps		
	The mechanical enclosure of a high pressure lamp shall have adequate strength to contain an explosion of the lamp so as to reduce the likelihood of harm to an operator or person near the equipment during normal use or operator servicing.		N/A
4.2.10	Wall or ceiling mounted equipment		
	The mounting means of equipment intended for wall or ceiling mounting shall be adequate.		P
4.3	Design and construction		
4.3.1	Edges and corners		
	Edges or corners could be hazardous to operators because of location or application in the equipment, they shall be rounded or smoothed.	No Sharp edges found	P
4.3.2	Handles and manual controls		
	Handles, knobs, grips, levers and the like shall be reliably fixed so that they will not work loose in normal use, if this might create a hazard. Sealing compounds and the like, other than self-hardening resins, shall not be used to prevent loosening.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
4.3.3	Adjustable controls		
	Equipment shall be so constructed that manual adjustment of a control device, such as device for selection of different a.c mains supply voltages, requires the use of a tool incorrect setting or inadvertent adjustment might create a hazard.		N/A
4.3.4	Securing of parts		
	Screws, nuts, washers, springs or similar parts shall be secured so as to withstand mechanical stresses occurring in normal use if loosening would create a hazard, or if Clearances or creepage distances for supplementary insulation or reinforced insulation would be reduced below the values specified in 2.10		N/A
4.3.5	Connection by plugs and sockets		
	A manufacturer's unit or system, plugs and sockets likely to be used by the operator or by a service person shall not be employed in a manner likely to create a hazard due to mis-connection		P
4.3.6	Direct plug-in equipment		
	Direct plug-in equipment shall not impose undue stress on the socket-outlet. The mains plug part shall comply with the standard for the relevant mains plug.		P
4.3.7	Heating elements in earthed equipment		
	The temperature sensing devices shall also disconnect the neutral conductor for each of the following cases:		-
a)	in equipment supplied from an IT power distribution system;		N/A
b)	in pluggable equipment supplied through a reversible appliance coupler or a reversible plug;		N/A
c)	in equipment supplied from a socket- outlet with indeterminate polarity.		N/A
4.3.8	Batteries		
	Portable secondary sealed cells and batteries (other than button) containing alkaline or other non-acid electrolyte shall comply with IEC 62133.		
-	Rechargeable battery;		N/A
-	non-rechargeable batteries,		N/A
-	Reverse charging of a rechargeable battery		N/A
4.3.9	Oil and grease		
	Internal wiring, windings, commutators, slip-rings and the like, and insulation in general, are exposed to oil, grease or similar substances, the insulation shall have adequate properties to resist deterioration under these conditions.		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
4.3.10	Dust, powders, liquids and gases		
	Equipment producing dust (for example, paper dust) or using powders, liquids or gases shall be so constructed that it is unlikely that either a dangerous concentration of these materials or a hazard in the meaning of this standard will be created by condensation, vaporization, leakage, spillage or corrosion during normal operation, storage, filling or emptying.		N/A
4.3.11	Containers for liquids or gases		
	Equipment that, in normal use, contains liquids or gases shall incorporate adequate safeguards against build-up of excessive pressure.		N/A
4.3.12	Flammable liquids		
	If a flammable liquid is used in equipment, the liquid shall be kept in a closed reservoir, except for the amount needed for the functioning of the equipment. The maximum quantity of flammable liquid stored in an equipment shall in general be not more than 5 l.		N/A
4.3.13	Radiation		
4.3.13.1	General		
	Equipment shall be so designed that the risk of harmful effects of radiation to persons, and damage to materials affecting safety, is reduced.		N/A
4.3.13.2	Ionizing radiation		
	For equipment that generates ionizing radiation, compliance is checked by the test in Annex H.		N/A
4.3.13.3	Effect of ultraviolet(UV) radiation on materials		
	only to equipment containing lamps that produce significant UV radiation, that is, having emission predominantly in the spectrum 180 nm to 400 nm, as specified by the lamp manufacturer.		N/A
4.3.13.4	Human exposure to ultraviolet (UV) radiation		
	The following requirements apply only to equipment containing lamps that produce significant UV radiation,that is having emission predominantly in the spectrum 180 nm to 400 nm as specified by the lamp manufacturer.		N/A
4.3.13.5	Lasers (including laser diodes) and LEDs		
4.3.13.5.1	Lasers (including laser diodes)		
	Except as permitted below, equipment shall be classified and labeled according to IEC 60825-1, IEC 60825-2 and IEC 60825-12, as applicable.		N/A


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4.3.13.5.2	Light emitting diodes (LEDS)		
	Equipment containing LEDs that produce optical radiation in excess of the limits specified in IEC 62471 in the wavelength range 200 nm to 3 000 nm, as specified by the lamp manufacturer, shall be provided with means (such as an interlock. barriers, guards or the equivalent) to reduce the likelihood of optical radiation exceeding the limits specified in IEC 62471		N/A
4.4	Protection against hazardous moving parts		
4.4.1	General		
	Moving fan blades, hazardous moving parts moving parts of the equipment (which means moving parts that have the potential to cause injury) shall be so arranged, enclosed or guarded to reduce the risk of injury to persons. Moving fan blades are evaluated in as accordance with 4.4.5.		N/A
4.4.2	Protection in operator access areas		
	Protection shall be provided by a suitable construction reducing the likelihood of access to hazardous moving parts, or by locating the moving parts in an enclosure provided with mechanical or electrical safety interlocks that remove the hazard when access is gained		N/A
4.4.3	Protection in restricted access locations		
	For equipment to be installed in a restricted access location, the requirements compliance criteria in 4.4.2 for operator access areas apply.		N/A
4.4.4	Protection in service access areas		
	A service access area, protection shall be provided such that unintentional contact with hazardous moving parts is unlikely during servicing operations involving other parts of the equipment.		N/A
4.4.5	Protection against moving fan blades		
4.4.5.1	General		
	Equipment shall be so constructed that the likelihood of injury from moving fan blades has been minimized.	No moving fan Blades	N/A
4.4.5.2	Protection for users		
	A moving fan blade classified as 4.4.5.1 a) may be located in an operator access area. Under a single fault condition, a moving fan blade classified as 4.4.5.1 a) may reach the limits permitted for a moving fan blade classified as 4.4.5.1 b).		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
4.4.5.3	Protection for service persons		
	No equipment protection from moving fan blades is required for the protection for service person.		N/A
4.5	Thermal requirements		
4.5.1	General		
4.5.2	Temperature tests		
	Materials used in components and in the construction of the equipment shall be selected so that under normal load, temperatures do not exceed safe values in the meaning of this standard.		P
4.5.3	Temperature limits for materials		
	The temperature of materials and components shall not exceed the values shown in Table 4B		P
4.5.4	Touch temperature limits		
	The temperatures of accessible parts in operator access areas shall not exceed the values shown in Table 4C.	See Table 4	P
4.5.5	Resistance to abnormal heat		
	Thermoplastic parts on which parts at hazardous voltage are directly mounted shall be resistant to abnormal heat.		P
4.6	Openings in enclosures		
4.6.1	Top and side openings		
	For equipment that is intended to be used in more than one orientation (see 1.3.6), the requirements of 4.6.1 apply in each		P
4.6.2	Bottoms of fire enclosures		
	For equipment that is intended to be used in more than one orientation (see 1.3.6), the requirements of 4.6.2 apply in each appropriate orientation.		N/A
4.6.3	Doors or covers in fire enclosures		
	If part of a FIRE enclosure consists of a door or cover leading to an operator access area, it shall comply with one of the following requirements:		-
-	the door or cover shall be interlocked to comply with the requirements in 2.8;		N/A
-	a door or cover, intended to be routinely opened by the operator, shall comply with both of the following conditions:		N/A
-	it shall not be removable from other parts of the fire enclosure by the operator; and		N/A
-	it shall be provided with a means to keep it closed during normal operation;		N/A

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-	a door or cover intended only for occasional use by the operator, such as for the installation of accessories, is permitted to be removable provided that the operating instructions include directions for correct removal and reinstallation of the door or cover.		N/A
4.6.4	Openings in transportable equipment		
	The risk of ignition caused by small metallic objects, such as paper clips or staples, moving around inside transportable equipment during transportation shall be reduced by measures to minimize the likelihood of such objects entering the equipment and bridging bare, conductive parts that may result in a fire hazard. Except as required in 4.6.4.3, provision of such measures is not required for bare conductive parts between which the power is limited in accordance with 2.5.	No transportable equipment	N/A
4.6.4.1	Constructional design measures		
	Examples of acceptable constructional design measures are:		-
-	providing openings that do not exceed 1 mm in width regardless of length; or		N/A
-	providing a screen having a mesh with openings not greater than 2 mm between centre lines and constructed with a thread or wire diameter of not less than 0,45 mm; or		N/A
-	providing internal barriers; or		N/A
-	other equivalent constructional means.		N/A
4.6.4.2	Evaluation measures for larger openings		
	Openings larger than specified in 4.6.4.1 are permitted (see also 2.1.1.1), provided that fault testing is conducted to simulate bridging along a direct straight path between bare conductive parts (for metallized parts, see 4.6.4.3) located less than 13 mm away from each other in all areas within the equipment that do not meet the criteria of 4.6.4.1.		N/A
4.6.4.3	Use of metallized parts		
	Where metallized parts of a plastic barrier or enclosure are within 13 mm of parts of circuits where the available power is greater than 15 VA, one of the following requirements a) or b) or c) applies		-
a)	access by a foreign metallic object shall be limited in accordance with 4.6.4.1, whether or not the available power meets the limits of 2.5; or		N/A
b)	there shall be a barrier between the bare conductive parts and the metallized barrier or enclosure ; or		N/A

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Clause no.	Requirement – Test	Results – Remarks	Verdict
c)	fault testing shall be conducted to simulate bridging along a direct path between a bare conductive part and the nearest metallized part of a barrier or enclosure that is within 13 mm of the bare conductive part.		N/A
4.6.5	Adhesives for constructional purposes		
	If a barrier or screen provided to comply with 4.6.1, 4.6.2 or 4.6.4 is secured with adhesive to the inside of the enclosure or to other parts inside the enclosure, the adhesive shall have adequate bonding properties throughout the life of the equipment.		N/A
4.7	Resistance to fire		
	This sub-clause specifies requirements intended to reduce the risk of ignition and the spread of flame, both within the equipment and to the outside, by the appropriate use of materials and components and by suitable construction.		N/A
4.7.1	Reducing the risk of ignition and spread of flame		
	For equipment or a portion of equipment, there are two alternative methods of providing protection against ignition and spread of flame that could affect materials, wiring, wound components and electronic components such as integrated circuits, transistors, thyristors, diodes, resistors and capacitors		N/A
	Method 1,- selection and application of components wiring and materials		N/A
	Method 2,- Application of all of simulated fault condition tests		N/A
4.7.2	Conditions for a fire enclosure		
	A fire enclosure is required when temperatures of parts under fault conditions could be sufficient for ignition.		-
4.7.2.1	Parts requiring a fire enclosure		N/A
4.7.2.2	Parts not requiring a fire enclosure		N/A
4.7.3	Materials		
4.7.3.1	General		
	Enclosures, components and other parts shall be so constructed, or shall make use of such materials, that the propagation of fire is limited.		P
4.7.3.2	Materials for fire enclosures		N/A
4.7.3.3	Materials for components and other parts outside fire enclosures		N/A
4.7.3.4	Materials for components and other parts inside fire enclosures		N/A
4.7.3.5	Materials for air filter assemblies		

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Clause no.	Requirement – Test	Results – Remarks	Verdict
	Air filter assemblies shall be constructed of V-2 class material, or HF-2 class formed material.		N/A
4.7.3.6	Materials used in high-voltage components		N/A
5	Electrical requirements and simulated abnormal conditions		
5.1	Touch current and protective conductor current		
	Except for application of 5.1.8.2, these requirements do not apply to equipment intended to be supplied by only a d.c mains supply.	Refer Table - 1	P
5.1.1	General		
	Equipment shall be so designed and constructed that neither touch current nor protective conductor current is likely to create an electric shock hazard.		P
5.1.2	Configuration of equipment under test (EUT)		
5.1.2.1	Single connection to an a.c. mains supply		
	Systems of interconnected equipment with one common connection to the AC Main supply shall be treated as a single piece of equipment		P
5.1.2.2	Redundant multiple connections to an a.c. mains supply		
	Equipment that is designed for multiple connections to the a.c mains supply, only one of which is required at a time, shall be tested with only one connection.		N/A
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		
	Equipment requiring power simultaneously from two or more a.c mains supplies shall be tested with all a.c mains supplies connected.		N/A
5.1.4	Application of measuring instrument		
	Tests are conducted using one of the measuring instruments in Annex D		P
5.1.5	Test procedure		-
5.1.6	Test measurements		-
5.1.7	Equipment with touch current exceeding 3,5 mA		-
5.1.7.1	General		
	Touch current measurement results exceeding 3,5 mA r.m.s. are permitted for the following equipment having a main protective earthing terminal:		P
-	stationary permanently connected equipment;		N/A
-	stationary pluggable equipment type B:		N/A
-	stationary pluggable equipment type A with a single connection to the a.c mains supply, and provided with a separate protective earthing terminal		P

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Clause no.	Requirement – Test	Results – Remarks	Verdict
-	Movable of stationary pluggable equipment type A		N/A
5.1.7.2	Simultaneous multiple connections to the supply		N/A
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N/A
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		
	The Touch current from equipment supplied from the a.c mains supply to a telecommunication network or to a cable distribution system shall be limited.		N/A
5.1.8.2	Summation of touch currents from telecommunication networks		
	EUT that provides telecommunication networks connection ports for connection of multiple items of other telecommunication equipment, shall not create a hazard for users and telecommunication network service persons due to Summation of touch current.		N/A
a)	EUT with earthed telecommunication ports		N/A
b)	EUT whose telecommunication ports have no reference to protective earth		N/A
5.2	Electric strength		
5.2.1	General	Class II equipment.	
	The electric strength of the solid insulation used in the equipment shall be adequate.		P
5.2.2	Test procedure		
	The insulation is subjected either to a voltage of substantially sine-wave form having a frequency of 50 Hz or 60 Hz, or to a d.c. test voltage equal to the peak voltage of the prescribed a.c. test voltage.	 Refer table - 2	P
5.3	Abnormal operating and fault conditions		
5.3.1	Protection against overload and abnormal operation		
	Equipment shall be so designed that the risk of fire or electric shock due to mechanical or electrical overload or failure, or due to abnormal operation or careless use, is limited as far as practicable.		P
5.3.2	Motors		

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Clause no.	Requirement – Test	Results – Remarks	Verdict
	Under overload, locked rotor and other abnormal conditions, motors shall not create a hazard due to excessive temperatures.		N/A
5.3.3	Transformers		
	Transformers shall be protected against overload, for example, by		
-	over current protection,		N/A
-	internal thermal cut-outs, or		N/A
-	use of current limiting transformers.		N/A
5.3.4	Functional insulation		
	For Functional insulation, clearances and creepage distances shall satisfy one of the following requirements a) or b) or c).		-
a)	They meet the clearances and creepage distances requirements for Functional insulation in 2.10 (or Annex G).		N/A
b)	They withstand the electric strength tests for Functional insulation in 5.2.2.		N/A
c)	They are short-circuited where a short-circuit could cause		N/A
5.3.5	Electromechanical components		N/A
5.3.6	Audio amplifiers in information technology equipment		N/A
5.3.7	Simulation of faults	Overload & short Circuit protection provided	P
5.3.8	Unattended equipment		
	Equipment intended for unattended use and having thermostats, temperature limiters and thermal cut-outs, or having a capacitor not protected by a fuse or the like connected in parallel with the contacts, is subjected to the following tests.		N/A
5.3.9	Compliance criteria for abnormal operating and fault conditions		
5.3.9.1	During the tests	No flame produce	P
5.3.9.2	After the tests		
	After the tests of 5.3.4 c), 5.3.5, 5.3.7 and 5.3.8 an electric strength test according to 5.2.2 is made on:		P
6	Connection to telecommunication networks		
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		
6.1.1	Protection from hazardous voltages		

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Clause no.	Requirement – Test	Results – Remarks	Verdict
	Circuitry intended to be directly connected to a telecommunication network shall comply with the requirements for an SELV circuit or a TNV circuit.		N/A
6.1.2	Separation of the telecommunication network from earth		
6.1.2.1	Requirements		
	Except as specified in 6.1.2.2, there shall be insulation between circuitry intended to be connected to a telecommunication network and any parts or circuitry that will be earthed in some applications, either within the EUT or via other equipment.		N/A
6.1.2.2	Exclusions		
6.2	Protection of equipment users from over voltages on telecommunication networks		
6.2.1	Separation requirements		
6.2.2	Electric strength test procedure		
	Compliance with 6.2.1 is checked by the test of either 6.2.2.1 or 6.2.2.2.		N/A
6.2.2.1	Impulse test		
	The electrical separation is subjected to ten impulses of alternating polarity, using the impulse test generator reference 1 of Table N.1.		N/A
6.2.2.2	Steady-state test		
	The electrical separation is subjected to an electric strength test according to 5.2.2.		N/A
6.2.2.3	Compliance criteria		
	During the tests of 6.2.2.1 and 6.2.2.2, there shall be no breakdown of insulation.		N/A
6.3	Protection of the telecommunication wiring system from overheating		
7	Connection to cable distribution systems		
7.1	General		
	If the equipment is to be connected to a cable distribution system, the requirements of Clause 7 apply in addition to the requirements of Clauses 1 to 5 of this standard.		N/A
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N/A
7.3	Protection of equipment users from over voltages on the cable distribution system		N/A
7.4	Insulation between primary circuits and cable distribution systems		

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7.4.1	General		
	The insulation between the primary circuit and the terminal or lead provided for the connection of a cable distribution system pass either:		-
-	the voltage surge test of 7.4.2 to the equipment intended to be connected to outdoor antennas; or		N/A
-	the impulse test of 7.4.3 for equipment intended to be connected to other cable distribution systems.		N/A
7.4.2	Voltage surge test		
	The test is applied between the supply circuit terminals and the main protective earthing terminal.		N/A
7.4.3	Impulse test		
	The test is applied between the supply circuit terminals and the main protective earthing terminal,		N/A

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Table - 1:

Bill of material

REVISIONS								
Sl.No	REVISION	DESCRIPTION				DATE	APPROVED	
1	00	Initial Document					A.S.REDDY	
SL.	Object	Manufacturer / Trademark	Type/Model / Part No.	Technical Data	Standard	Mark(s) of conformity ¹	Store Code	Qty.
PCB								
1	Printed Circuit Board.	S.V.R CIRCUITS		37.50 x 42 mm single side paper epoxy	E123995	UL	HPCAD00074	1
	Alternate.	BPL / ASCENT/GARG		pcb thickness 1.6 mm. Cu clad	E151585	UL		
				thickness 35microns	E103670	UL		
				Ref. Doc. No :				
				APP / PCB / 1185				
				FOLLOW LATEST VERSION				
SEMI CONDUCTORS								
2	Switching Device (U1).	Power Int.	SC1142D3	Primary side Regulation Controller IC			CIC0000060	1
				Link S - III, SMD - 8B Package.				
3	Rectifier Diode(BD1)	DIODES / MIC / TSC	ABS10	SMD Bridge rectifier, Vrrm: 1000V,			CDI0000067	1
	Alternate			If: 1.1A, SOPA-4 Package				
4	Snubber Rectifier (D1).	GOOD ARK	1N4007	DIODE RECTIFIER 1N4007,			CDI0000085	1
	Alternate	MIC / HY		1KV, 1A, DO- 213AA (SMD) PACKAGE				
5	Snubber Rectifier (D2).	GOOD ARK	RS1G/US1G	ULTRA FAST RECTIFIER,			CDI0000073	1
	Alternate	MOTOROLA / HB / BL		Vrr: 400V, 1.0A D0214ACSMF PACKAGE				
6	Output Rectifier (D3)	DIODES / NXP	PMEG4050EP	Schottky Barrier Rectifier Diode			CDI0000086	1
	Alternate			Vrrm: 40V, If: 5A, Vf: 0.43V				
				SOD-128 SMD Package.				
CAPACITORS(EL)								
7	EL - CAP (C1,C2).	SANCON / SZWX	4.7µF/450V	4.7µF, 450V ± 20% 105°C.			BELA50475M	2
	Alternate	JACKON / KOSHIN		8 ø x 11mm				

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SL.	Object	Manufacturer / Trademark	Type/Model / Part No.	Technical Data	Standard	Mark(s) of conformity ¹	Store Code	Qty.
8	EL - CAP (C7,C8)		470µF/6.3V	470µF, 6.3V ± 20% 105°C.			BELO5A477M	2
	Alternate			6.3 ø x 8mm				
				CAPACITORS (CD)				
9	Y - CAP (C6)	JNC	JN222Y1	2.2nF, 400V ± 20%,	E201384	UL	BCDY1N2N2M	1
	Alternate	JEC	JD222Y5UY1	Epoxy Coated Y1 Capacitor.	E187963	UL		
				CERAMIC DISC (0805Pack)SMD				
10	CD -CAP (C3)	JACKCON / HEL / TOPMAY	102/500V	1nF, 500V, X7R +/-10%,			BSN00P102K	1
11	CD -CAP (C4,C5)	KEMET / YAGEO / POLY AVX	105/25V	1µF, 25V, X7R ± 10%			BSN00C105K	2
12	CD -CAP (C9)	JACKCON / HEL / TOPMAY	104V/50V	100nF, 50V, X7R +/-20%,			BSN00F104M	1
				RESISTORS				
13	FUSIBLE RESISTOR (F1)	CERMET/	10E	WWR 1W ± 5% Fusible Resistor			AWW0D010EJ	1
				Sub- Miniature				
				RESISTORS (SMD-1206)				
14	RESISTOR (R2)	ROYAL OHM / VISHAY / YAGEO	330K	MFR ¼ W ± 5%			ASMOB330KJ	1
15	RESISTOR (R1)	ROYAL OHM / VISHAY / YAGEO	4K7	MFR ¼ W ± 5%			ASMOB04K7J	1
				RESISTORS (SMD-0805)				
16	RESISTOR (R3)	ROYAL OHM / VISHAY / YAGEO	330E	MFR ¼ W ± 5%			ASN0B330EJ	1
17	RESISTOR (R4)	ROYAL OHM / VISHAY / YAGEO	3.3E	MFR ¼ W ± 5%			ASN0B03E3J	1
18	RESISTOR (R5)	ROYAL OHM / VISHAY / YAGEO	34K	MFR ¼ W ± 1%			ASN0B034KH	1
19	RESISTOR (R7)	ROYAL OHM / VISHAY / YAGEO	9K1	MFR ¼ W ± 1%			ASN0B09K1H	1

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SL.	Object	Manufacturer / Trademark	Type/Model / Part No.	Technical Data	Standard	Mark(s) of conformity ¹	Store Code	Qty.
20	RESISTOR (R6)	ROYAL OHM / VISHAY / YAGEO	270K (SOT)	MFR ¼ W ± 5%			ASN0B270KJ	1
21	RESISTOR (R9,R8)	ROYAL OHM / VISHAY / YAGEO	2K2	MFR ¼ W ± 5%			ASN0B02K2J	2
MAGNETICS								
22	Main Transformer (T1)	BOBBIN - EI DUPONT	EPC13 H	Main Transformer	E41938	UL	DMTAD00053	1
	Alternate	BOBBIN - HEXON (Alternate)	10 PIN	Ref. Doc No. :	E61040	UL		
		COPPER - TAYA ELECTRIC		APP / MAG / 1187	E225803	UL		
		COPPER - JUNG SHING (Alternate)		FOLLOW LATEST REVISION	E174837	UL		
		TAPE - SYMBIO			E50292	UL		
		TAPE - INTEK (Alternate)			E171030	UL		
		Supplier: Nandhini / Indotek						
23	Inductor (L1).	COIL CRAFT	AXIAL TYPE 5 X 6mm	1mH,350mA, Axial type Inductor colour coded inductor			DIDAD00024	1
24	Inductor (L2).	COIL CRAFT / MURATA Electronics	1008LS LQM21FN100M70L	10µH±5%,100mA SMD Inductor (0805 / 1008LS Package)			DIDAD00026	1
25	Output Inductor (L3).	COPPER - TAYA ELECTRIC	AXIAL TYPE	2.2µH,1.0A, Axial type Inductor			DIDAD00025	1
		SLEEVE - SHENZHEN WOER	3 X 8mm	Ref. Doc No. :	E203950			
		SLEEVE - JIANGSU DASHENG		APP / MAG / 1187	E203831			
				FOLLOW LATEST REVISION				
26	AC Wires	ROLLI FLEX	2464	12/0.15 SWIG PVC Blue wire with UL,	E311814	UL	FWI0000003	0.12mtr
	Alternate	DONGGUAN ZHENGWEI	2464	Insulation & Copper.1.8mm Dia	E326510	UL		
27	USB	SHENZHEN JIALI ASIA INDUSTRY	CAF235-C1113-J	USB2.0, A-Type, Female PCB mountable			IMIC000132	1
				Ref. Doc No. :				
				APP / MECH / 1186				
				FOLLOW LATEST REVISION				

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SL.	Object	Manufacturer / Trademark	Type/Model / Part No.	Technical Data	Standard	Mark(s) of conformity ¹	Store Code	Qty.
				FINISHED GOODS				
28	Plastic Enclosure.	LG CHEM LTD	Q1 -TYPE	Plastic Moulded Enclosure	E67171	UL	KPEQ000012	1
		FABRICATION : VEJETHA / INNOVAT	AF312T1/ AF312B	Ref. Doc No. :				
	Alternate	STYROLUTION ABS INDIA LTD	ABSOLAC 300FR	APP / MECH / 1190	E141234	UL		
	Alternate	BHANSALI ENGINEERING POLYMERS	AN450M	FOLLOW LATEST VERSION	E149856	UL		
29	Output Cable	DONGGUAN ZHENGWEI CABLE	USB CABLE	A-USB Powerchord With Micro USB Cab	E326510	UL	FPCDC00102	1
				Ref. Doc No. :				
				APP / CON / 1188				
				FOLLOW LATEST VERSION				
30	Lead	BHAVANI, KHANNA TRADERS	22SWG	SOLDER WIRE, 99.3 ROSINE CORED, NO CLEANING FLUX WITH ROHS		RoHS	IMI0000047	Apply
31	Sticker (For Enclosure)	Ennel Ind.	Lazer Printing	Main Sticker Printing Details Ref. Doc No. : APP / ASLY / 1193 FOLLOW LATEST VERSION			JLAAD00307	1
32	Silicon Sticks	ACRO BOND / MARIO		Silicon Sticks	UL		IMI0000007	0.01
33	Polythene cover.	KANYAKA PARMASHWARI		Translucent polythene cover. (L 55 x B 75 mm).			JPM0000016	1
34	Mylar Sheet for USB & AC WIRES	APPROVED VENDOR	40 X 35 38 X 5	Mylar Sheet Ref. Doc No. : APP / MECH / 1189 FOLLOW LATEST REVISION			IMI0000131	1
35	Mother carton	NICE INDIA		7 Ply Mother Carton Ref. Doc No. : APP / ASLY / 057 FOLLOW LATEST VERSION			JPM0000013	0.01

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SL.	Object	Manufacturer / Trademark	Type/Model / Part No.	Technical Data	Standard	Mark(s) of conformity ¹	Store Code	Qty.
36	Buffer Sheet	VIJYA PACKAGE NICE INDIA		3 Ply Buffer Sheet Ref. Doc No. : APP / ASLY / 58 FOLLOW LATEST VERSION			JPM0000014	0.06
37	Partition sheet	VIJYA PACKAGE NICE INDIA		5 Ply Partition Sheet Ref. Doc No. : APP / ASLY / 059 FOLLOW LATEST VERSION			JPM0000015	0.05
38	Mother Carton Crimping Tie	SRI ADITYA POLYMERS	White	W12mm x T 0.5mm Poly Prolylene			IMI0000005	Apply
39	Packing Tape	MIRACLE	Transparent	3 Inch packing tape			MPS0000001	Apply

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Table -2

2.10.3 and 2.10.4	TABLE: Clearance and creepage distance measurements			P
Clearance (cl) and creepage distance (cr) at/of/between:	Required Cl (mm)	Measured Cl (mm)	Required Cr (mm)	Measured Cr (mm)
Between different polarity	0.4	5.52	0.4	5.52
Between different polarity	0.4	5.52	0.4	5.52

TABLE- 3

Clause. No.	Test Conducted	Test Conditions	Values Measured	Results
Cl. 2.10.3.3	Impulse Test (Transient overvoltage)	Transient Overvoltage: 2500V The impulse test voltage is applied Six times for each polarity with intervals of at least 1 s.		N/A
Cl. 5.1	Touch Current	Pluggable type – a maximum Touch current Should be Less than 3.5 mA	Under 4.53 µA	P
Cl. 5.2.2	High Voltage Test	Test voltage: : 1500 V Test Duration: 1 min. Test Part: Between shorted Polarity part and metal foil	No flashover/ Breakdown occur	P

TABLE- 4

4.5, 4.5.4	Thermal Requirement (Touch Temperature limit)		P
Measured temperature of parts	Maximum allowed temperature (°C)	Measured temperature (°C)	
External surface of metal part of controller	70°C	N/A	
PVC Insulation	75°C	N/A	
Metal	55°C	N/A	
Mode Switch (Plastic)	85°C	29.5	
Note:- Ambient T max (°C)= 25.0			