Test Report

Report No	222/4676071 BSI digital copy	This Report consists of 33 pages
Client	Kentec Electronics Limited Unit 25 Dartford Trade Park Dartford Kent DA1 1JQ	
Authority & date	Quotation Acceptance dated 1 December 2004	
Items tested	Sigma XT Extinguishant Control Panel, Model K11031M2 Rated 230V～, 1A, 50Hz Equipment Record Number 10066869	
Specification	Limited testing to BS EN 54-4:1998 Clause 6.3 2	
Results	Complies with the requirements of the clauses tested within See general remarks on page 5 & 6	
Prepared by	J Pankhania 	Senior Engineer
Authorized by	M Adams 	Principal Engineer
Issue Date	21 June 2005	
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of *PS082* 'General conditions relating to acceptance of testing'. The results contained herein apply only to the particular sample/s tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the Managing Director, BSI Product Services, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.	

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TEST RESULTS
BS EN 54-4:1998
Clause 6.3.2

TEST REPORT

BS EN 54-4:1998
Clause 6.3.2 only
Fire Detection and Fire Alarm Systems, Part 4. Power Supply Equipment

Report Reference No	: 222/4676071
Compiled by	: J Pankhania
Testing laboratory.....	: BSI Product Services
Address.....	: Maylands Avenue, Hemel Hempstead, Hertfordshire HP2 4SQ
Testing location	: England
Applicant	: Kentec Electronics Ltd
Address	: Same as front cover
Standard	: BS EN 54-4:1998 clause 6.3.2 only
Test Report Form No	: 54-4
TRF originator	: BSI

Test procedure	: BSI Kitemark Scheme
Procedure deviation	: None
Non-standard test method	: None
Type of test object	: Extinguishant Control Panel
Trademark	: -
Model/type reference	: SIGMA XT, Model
Rating	: 230V AC, 1A, 50Hz
Class of equipment	: Class I
Equipment mobility	: Fixed/permanent connection

Copy of marking plate:

No Label affixed to the panel, assessment was conducted with a drawing in the manual. The client declared that the printing process and printing material will be identical to that assessed in BSI Report No 222/4427388

Possible test case verdicts :

- test case does not apply to the test object ..... : N
- test object does meet the requirements ..... : P
- test object does not meet the requirements ..... : F

1) Manufacturer	: Kentec Electronics Ltd
Address	: Unit 25 Dartford Trade Park
	: Dartford
	: Kent. DA1 1JQ

General remarks:

('see appended table') refers to a table appended to the Report.

Throughout this Report a point is used as the decimal separator.

The results contained within this Report only relate to the sample submitted for testing.

The sample submitted for assessment to BS EN 54-4:1998 Clause 6.3.2 was a Model K11031M2, manufactured by Kentec Electronics Limited. The model K11031M2 is a surface mount version and Model K11031F2 is with a flush mounting bezel.

The measurements recorded in this report only relate to the tested item detailed above and demonstrate conformity with the stated specification.

The item tested was selected by the client as the optimum representative of the product group detailed above with which it has design and constructional similarity and a commonality of materials and components.

Consequently, if all the items in the group were to be tested they would in all probability conform with the specification stated on the front cover of this report.

In this submission no detectors or sounders were provided to simulate the load, the client declared that the maximum current drawn on the 24V rail from within the equipment by the external devices is 2.3Amps and 0.7A for battery charging. All testing was conducted with this rated load.

The client declared that the PSU within the Panel was identical to the Sigma II range, assessed in BSI Reports Nos 222/4427388 and 222/4519621 the only difference being component designations, hence only limited testing on the PSU was conducted in this submission. Results from previous reports where applicable were extracted to compile this report. The enclosure and component mounted were also identical to that previously assessed.

The assessment conducted in this submission to establish continued compliance was Markings, comparison of critical components against BSI Reports Nos 222/4427388 and 222/4519621, Power Interface, Heating, Leakage, Flash Test, Earth Bond and overload test on +24V rail output.

General remarks (continued)

Samples were received on 31 March 2005

Testing commenced on 7 April 2005 and ended on 18 May 2005

Testing Environment:

- An ambient temperature in the range 15°C to 25°C
- A relative humidity in the range 25% to 75%
- An air pressure in the range 86 kPa to 106 kPa

BS EN 54-4:1998			
Clause		**Results**	**Verdict**
6.3	**Electrical Design**		
6.3.2	The p.s.e shall have safety characteristic in accordance with IEC 950:1991 for protection against direct and indirect contact, for the separation of extra low voltage d.c. circuits from the low voltage a.c. circuits and for earthing of metal parts.		P

IEC 950		
RESULTS		**VERDICT**
1	**General**	
1.5	Components	P
1.6	Power interface	P
1.7	Marking and instructions	P

2	**Protection from Hazards**	
2.1	Protection against electric shock and energy hazards	P
2.2	Insulation	P
2.3	Safety extra-low voltage (SELV) circuits	P
2.4	Limited current circuits	N
2.5	Provisions for earthing	P
2.6	Disconnection from primary power	P
2.7	Overcurrent and earth fault protection in primary circuits	P
2.8	Safety interlocks	N
2.9	Creepage distances, clearances and distances through insulation	P
2.10	Interconnection of equipment	P
2.11	Limited power source	N

3	**Wiring, connections and supply**	
3.1	General	P
3.2	Connection to primary power	P
3.3	Wiring terminals for external primary power supply conductors	P

IEC 950		
RESULTS (continued)		**VERDICT**
4	**Physical requirements**	
4.1	Stability and mechanical hazards	P
4.2	Mechanical strength and stress relief	P
4.3	Construction details	P
4.4	Resistance to fire	Not Assessed *

5	**Thermal and electrical requirements**	
5.1	Heating	P
5.2	Earth leakage current	P
5.3	Electric strength	P
5.4	Abnormal operating and fault conditions	P

6	**Connection to telecommunication network**	
6.1	General	N
6.2	TNV circuits	N
6.3	Protection from hazards in the equipment	N
6.4	Protection of equipment users from voltages on telecommunication networks	N
6.5	Protection of the telecommunication wiring system from overheating	N

* The client did not request assessment to this clause and also it is not called up by the standard BS EN 54-4:1998 Clause 6.3.2.

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
1	**GENERAL**		
1.5	**Components**		
1.5.1	Comply with this or relevant IEC component standard	(see appended table)	P
1.5.2	Evaluation and testing of components		P
1.5.3	Transformers		P
1.5.4	Flammability class of high voltage components		N
1.5.5	Interconnecting cables		N
1.5.6	Mains capacitors		N

1.6	**Power interface**		
1.6.1	Rated current (A) .....:	1	P
	Measured current (A) .....:	0.648	P
	Deviation .....:		P
1.6.2	Voltage limit of hand-held equipment.....:		N
1.6.3	Neutral conductor insulated from earth and body .....:		P
1.6.4	Components in equipment intended for IT power system .....:		N
1.6.5	Rated supply tolerance (V) .....:	± 10%	P

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**

1.7	**Marking and instructions**		
1.7.1	Rated voltage (V) .....:	230	P
	Symbol of nature of supply for d.c. .....:		N
	Rated frequency (Hz) .....:	50	P
	Rated current (A).....:	1	P
	Manufacturer .....:	Kentec	P
	Trademark .....:		-
	Type/model	K11031M2	P
	Symbol of Class II .....:		N
	Certification marks .....:		N
1.7.2	Safety Instructions.....:		P
1.7.3	Short duty cycles .....:		N
1.7.4	Marking for voltage setting/frequency setting ..:		N
1.7.5	Marking at power outlets .....:		N
1.7.6	Marking at fuseholders .....:		P
1.7.7.1	Protective earthing terminals .....:		P
1.7.7.2	Terminals for external primary power supply conductors.....:		P
1.7.8.1	Identification and location of switches and controls .....:		N
1.7.8.2	Colours of controls and indicators .....:		N
1.7.8.3	Symbols according to IEC 417 .....:		N
1.7.8.4	Markings using figures.....:		N
1.7.8.5	Location of marking and indications for switches and controls .....:		N
1.7.9	Isolation of multiple power sources .....:		N
1.7.10	Instructions for installation to IT power systems .....:		N
1.7.11	Instructions when protection relies on building installation .....:		P
1.7.12	Marking when leakage current is more than 3.5 mA.....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
1.7.13	Indication at thermostats and other regulating devices .....:		N
1.7.14	Language of safety marking/ instructions.....:		P
	Language .....:	English	P
1.7.15	Durability and legibility.....:	See comment on page 4	P
1.7.16	Removable parts .....:		P
1.7.17	Warning text for replaceable lithium batteries ..:		N
	Language .....:		N
1.7.18	Operator access with a tool .....:		N
1.7.19	Instructions for restricted access locations .....:		N

2	**PROTECTION FROM HAZARDS**		
2.1	**Protection against electric shock and energy hazards**		
2.1.1	Access to energized parts .....:		P
2.1.2	Protection in operator access areas.....:		P
2.1.3.1	Insulation of internal wiring in ELV circuit accessible to operator.....:		N
2.1.3.2	Operator accessible insulation of internal wiring at hazardous voltage .....:		N
2.1.4.1	Protection in service access areas.....:		P
2.1.4.2	Protection in restricted access locations .....:		N
2.1.5	Energy hazard in operator access areas.....:		P
2.1.6	Clearances behind conductive enclosures.....:		P
2.1.7	Shafts of manual controls .....:		N
2.1.8	Isolation of manual controls .....:		N
2.1.9	Conductive casings of capacitors.....:		N
2.1.10	Risk of electric shock from stored charge on capacitors connected to mains circuit .....:		P
	Time-constant (s).....:	<0.1	P

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**

2.2	**Insulation**		
2.2.1	Methods of insulation.....:		P
2.2.2	Properties of insulation materials.....:		P
2.2.3	Humidity conditioning.....:		N
2.2.4	Requirements for insulation .....:		P
2.2.5	Insulation parameters .....:		P
2.2.6	Categories of insulation .....:	Basic & Reinforced	P
2.2.7.5	Electric strength tests .....:		P
2.2.8.1	Bridging capacitors.....:		N
2.2.8.2	Bridging resistors.....:		N
2.2.8.3	Accessible parts .....:		N

2.3	**Safety extra-low voltage (SELV) circuits**		
2.3.1	Voltage (V) of SELV circuits under normal operating conditions and after single fault.....		P
2.3.2	Voltage (V) between any two conductors of SELV circuits(s) and for Class 1 equipment between any conductor of SELV circuit and equipment protective earthing terminal under normal operating conditions.....:		P
2.3.3	Voltage (V) of SELV circuit in event of single failure of basic or supplementary insulation or of component .....:		P
	Method used for separation .....:	1	-
2.3.4	Additional constructional requirements .....:		P
2.3.5	Connection of SELV circuits to other circuits ...:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
2.4	**Limited current circuits**		
2.4.2	Frequency (Hz) .....:		N
	Measured current (mA).....:		N
2.4.3	Measured voltage (V) .....:		N
	Measured capacitance (μF) .....:		N
2.4.4	Measured voltage (V) .....:		N
	Measured charge (μC) .....:		N
2.4.5	Measured voltage (V) .....:		N
	Measured energy (mJ) .....:		N
2.4.6	Limited current circuit supplied from or connected to other circuits.....:		N
2.5	**Provisions for earthing**		
2.5.1	Class 1 equipment.....:		P
	Warning label for service personnel.....:		N
2.5.2	Protective earthing in Class II equipment.....:		N
2.5.3	Switches/fuses in earthing conductors.....:		P
2.5.4	Assured earthing connection for Class I equipment in systems comprising Class I and Class II equipment.....:		N
2.5.5	Green/yellow insulation.....:		P
2.5.6	Continuity of earth connections.....:		P
2.5.7	Making and breaking of protective earthing connections .....:		P
2.5.8	Disconnection protective earthing connections		P
2.5.9	Protective earthing terminals for fixed supply conductors or for non-detachable power supply cords .....:		P
2.5.10	Corrosion resistance.....:		P
2.5.11	Resistance (Ω) of protective earthing conductors $\leq$ 0.1 Ω .....:	0.07Ω	P
	Test current (A) .....:	25A	P

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
2.6	**Disconnection from primary power**		
2.6.1	General requirements.....:		P
2.6.2	Type of disconnect device .....:	Isolating Switch	P
2.6.3	Disconnect device in permanently connected equipment.....:		P
2.6.4	Parts of disconnect device which remain energized.....:		N
2.6.5	Switches in flexible cords.....:		N
2.6.6	Disconnection of both poles simultaneously in single-phase equipment.....:		P
2.6.7	Disconnection of all phase conductors of supply in three-phase equipment.....:		N
2.6.8	Marking of switch acting as disconnect device.:		N
2.6.9	Installation instructions if plug on power supply cord acts as disconnect device .....:		N
	Language .....:		N
2.6.11	Interconnected equipment .....:		N
2.6.12	Multiple power sources.....:		N

2.7	**Overcurrent and earth fault protection in primary circuits**		
2.7.1	Basic requirements .....:		P
2.7.2	Protection against faults not covered in 5.4 .....:		P
2.7.3	Short circuit back-up protection .....:		P
2.7.4	Number and location of protective devices .....:	1 in Live	P
2.7.5	Protection by several devices .....:		N
2.7.6	Warning to service personnel .....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**

2.8	**Safety interlocks**		
2.8.2	Design .....:		N
2.8.3	Protection against inadvertent reactivation .....:		N
2.8.4	Reliability .....:		N
2.8.5	Overriding an interlock.....:		N
2.8.6.1	Contact gap (mm).....:		N
2.8.6.2	Switch performing 50 cycles .....:		N
2.8.6.3	Electric strength test: test voltage (V) .....:		N
2.8.7	Protection against overstress.....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
2.9	**Clearance, Creepage distances and distances through insulation**		
	Nominal voltage (V) .....:	230V	P
2.9.1	General.....:		P
2.9.2	Clearances .....:		P
2.9.2.1	Clearances in primary circuits.....:	(see appended tables 2.9.2 and 2.9.3)	P
2.9.2.2	Clearances in secondary circuits .....:	(see appended tables 2.9.2 and 2.9.3)	P
2.9.3	Creepage .....:	(see appended tables 2.9.2 and 2.9.3)	P
	CTI tests .....:		P
2.9.4.1	Minimum distances through insulation .....:		P
2.9.4.2	Thin sheet material.....:		P
	Number of layers (PCs) .....:	3	P
	Electrical strength test: test voltage .....:	(see appended table 5.3)	P
2.9.4.3	Printed boards.....:		N
	Distance through insulation		N
	Electric strength test at voltage for thin sheet insulation material.....:		N
	Number of layers (PCs) .....:		N
2.9.4.4	Wound components without interleaved insulation .....:		N
	Number of layers (PCs) .....:		N
	Two wires in contact inside component; angle between 45° and 90° .....:		N
	Routine testing for finished component.....:		N
2.9.5	Distances on coated printed boards.....:		N
	Routine testing for electric strength.....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
2.9.6	Enclosed and sealed parts.....:		N
	Temperature T1 (°C) .....:		N
	Humidity (%).....:		N
2.9.7	Spacings filled by insulating compound .....:		N
	Temperature T1 (°C) .....:		N
	Humidity (%).....:		N
2.9.8	Component external termination's .....:		N
2.9.9	Insulation with varying dimensions.....:		N
2.10	**Interconnection of equipment**		
2.10.1	General requirements.....:		P
2.10.2	Type of interconnection circuits .....:	SELV	P
2.10.3	ELV circuits as interconnection circuits.....:		N
2.11	**Limited power source**		
	Use of limited power source .....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
3	**WIRING, CONNECTIONS AND SUPPLY**		
3.1	**General**		
3.1.1	Cross-sectional area of internal wiring/interconnecting cables.....:		P
	Protection of internal wiring and interconnecting cables.....:		P
3.1.2	Wireways.....:		P
3.1.3	Fixing of internal wiring.....:		P
3.1.4	Fixing of uninsulated conductors .....:		N
3.1.5	Insulating of internal wiring .....:		P
3.1.6	Wires coloured green/yellow only for protective earth connection.....:		P
3.1.7	Fixing of beads and similar ceramic insulators.:		N
3.1.8	Required electrical contact pressure.....:		P
3.1.9	Reliable electrical connections.....:		P
3.1.10	End of stranded conductor.....:		P
3.1.11	Use of spaced thread screws/thread-cutting screws.....:		N
3.2	**Connection to primary power**		
3.2.1	Type of connection .....:	Terminals	P
	Design of product with more than one supply connection.....:		N
3.2.2	Provision for permanent connection .....:		P
3.2.3	Appliance inlet.....:		N
3.2.4	Type and cross-sectional area (mm^2) of power supply cord .....:		N
3.2.5	Cord anchorage.....:		N
3.2.6	Protection of power supply cord.....:		N
3.2.7	Cord guard .....:		N
3.2.8	Supply wiring space.....:		P

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
3.3	**Wiring terminals for external primary power supply conductors**		
3.3.1	Terminals.....:		P
3.3.2	Special non-detachable cord .....:		N
	Type of connection .....:		N
	Pull test at 5 N .....:		N
3.3.3	Screws and nuts .....:		P
3.3.4	Fixing of conductors.....:		P
3.3.5	Connection of connectors .....:		P
3.3.6	Size of terminals .....:		P
	Nominal thread diameter (mm) .....:	3.5	P
3.3.7	Protection against damage of conductors.....:		P
3.3.8	Terminal location .....:		N
3.3.9	Test with 8 mm stranded wire .....:		P
4	**PHYSICAL REQUIREMENTS**		
4.1	**Stability and mechanical hazards**		
4.1.1	Stability tests .....:	Fixed Equipment	N
	Angle of 10º.....:		N
	Test: force (N) .....:		N
4.1.2	Protection against personal injury.....:		N
4.1.3	Warning and means provided for stopping the moving part .....:		N
4.1.4	Edges and corners .....:		P
4.1.5	Enclosure of a high pressure lamp.....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**

4.2	**Mechanical strength and stress relief**		
4.2.1	General.....:		P
4.2.2	Internal enclosures 30 N ± 3 N; 5 s.....:		N
4.2.3	External enclosures 250 N ± 10 N; 5 s.....:		P
4.2.4	Steel ball tests .....:	Metal enclosure	P
	Fall test.....:		P
	Swing test.....:		P
4.2.5	Drop test.....:		N
4.2.6	Heat test for enclosure of moulded or formed thermoplastic materials: 7 h; T (°C) .....:		N
4.2.7	Compliance criteria.....:		P
4.2.8	Mechanical strength of cathode ray tubes.....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**
4.3	**Construction details**		
4.3.1	Changing of setting for different power supply voltages.....:		N
4.3.2	Adjustment of accessible control devices.....:		N
4.3.4	Prevention of dangerous concentration of dust, powder, liquid and gas.....:		N
4.3.5	Fixing of knobs, grips, handles, levers		N
	Test; force (N).....:		N
4.3.6	Driving belts/couplings shall not ensure electrical insulation .....:		N
4.3.7	Retaining of sleeves .....:		N
4.3.9	Protection of loosening parts .....:		P
4.3.11	Resistance to oil and grease.....:		N
4.3.12	Protection against harmful concentration of ionizing radiation or ultraviolet light, laser or flammable gases (for laser see IEC 825-1).....:		N
4.3.13	Securing of screwed connections .....:		P
4.3.15	Openings in tops of enclosure .....:		P
	Dimensions (mm) .....:	No opening	P
4.3.16	Openings in sides of enclosure.....:		P
	Dimensions (mm) .....:	No opening	P
4.3.17	Interchangeable plugs and sockets.....:		N
4.3.18	Torque test for direct plug-in equipment		N
	Additional torque (Nm).....		N
4.3.19	Protection against excessive pressure.....:		N
4.3.20	Protection of heating elements in Class 1 equipment.....:		N
4.3.21	Protection of lithium batteries.....:		N
	Construction of protection circuit.....:		N
4.3.22	Ageing of barrier/screen secured with adhesive .....:		N

IEC 950			
Clause	**Requirement – Test**	**Result**	**Verdict**

4.4	**Resistance to fire**		
4.4.1	Methods of achieving resistance to fire.....:		N
4.4.2	Minimizing risk of ignition.....:		N
	Printed board: manufacturer; type; flammability .....:		N
4.4.3	Flammability of materials and components.....:		N
4.4.3.2	Material and component: manufacturer; type; flammability .....:		N
4.4.3.3	Exemptions.....:		N
4.4.3.4	Wiring harnesses: manufacturer; flammability..:		N
4.4.3.5	Cord anchorage bushings: manufacturer; flammability .....:		N
4.4.3.6	Air filter assemblies: manufacturer; flammability:		N
4.4.4	Enclosures and decorative parts; manufacturer; type/flammability .....:		N
4.4.5	Conditions for fire enclosures .....:		N
4.4.5.1	Components requiring fire enclosure: manufacturer; flammability.....:		N
4.4.5.2	Components not requiring fire enclosure .....:		N
4.4.6	Fire enclosure construction.....:		N
4.4.7	Doors or covers in fire enclosures.....:		N
4.4.8	Flammable liquids.....:		N

This clause was not assessed, as it is not required by the standard BS EN 54-4:1998 Clause 6.3.2.

IEC 950			
Clause	**Requirement - Test**	**Result**	**Verdict**
5	**THERMAL AND ELECTRICAL REQUIREMENTS**		
5.1	**Heating**		
	Heating tests .....:	(see appended table 5.1)	P
5.2	**Earth leakage current**		
5.2.1	General.....:		P
5.2.2	Leakage current.....:		P
	Test voltage (V) .....:	254	P
	Measured current (mA) .....:	L – 0.028 N – 0.066	P
	Max allowed current (mA) .....:	3.5	P
5.2.3	Single-phase equipment.....:		P
5.2.4	Three-phase equipment.....:		N
5.2.5	Equipment with earth leakage current exceeding 3.5 mA.....:		N
	Test voltage (V).....:		N
	Measured current (mA).....		N
	Max. allowed current (mA).....:		N
	Cross-sectional area (mm^2) of internal protective earthing conductor.....:		N
	Warning label .....:		N

IEC 950			
Clause	**Requirement - Test**	**Result**	**Verdict**
5.3	**Electric strength**		
5.3.1	General		P
5.3.2	Test procedure	(see appended table 5.3)	P
5.4	**Abnormal operating and fault conditions**		
5.4.2	Motors .....:		N
5.4.3	Transformers .....:	(see appended table 5.4)	P
5.4.4	Compliance of operational insulation .....:		P
	Method used .....:	c	P
5.4.5	Electromechanical components in secondary circuits .....:		N
5.4.6	Other components and circuits .....:	(see appended table 5.4)	P
5.4.7	Test in any expected condition and foreseeable misuse .....:	(see appended table 5.4)	P
5.4.8	Unattended use of equipment having thermostats, temperature limiters etc.....:		N
5.4.9	Compliance .....:	(see appended table 5.4)	P
5.4.10	Ball pressure test of thermoplastic parts; impression shall not exceed 2 mm.....:	(see appended table 5.4.10)	P

IEC 950			
Clause	**Requirement - Test**	**Result**	**Verdict**
6	**CONNECTION TO TELECOMMUNICATION NETWORK**		
6.1	**General**		
6.2	**TNV circuits**		
6.2.1.1	Limits of TNV circuits.....:		N
a)	TNV-1 circuit.....:		N
b)	TNV-2 & TNV-3 circuits .....:		N
6.2.1.2	Separation from other circuits and from accessible parts .....:		N
	Voltages (V) in SELV circuits, TNV-1 circuits and accessible parts in the event of a single insulation fault or component failure .....:		N
6.2.1.3	Operating voltages generated externally.....:		N
	Voltages (V) in SELV circuits, TNV-1 circuits or accessible conductive parts.....:		N
6.2.1.4	Separation from hazardous voltages		N
	Insulation between TNV circuit and circuit at hazardous voltage .....:		N
	Method used .....:		N
6.2.1.5	Connection of TNV circuits to other circuits .....:		N
	Insulation (mm) between TNV circuit supplied conductively from secondary circuit and hazardous voltage circuit.....:		N
6.2.2.1	Protection against contact with bare conductive parts of TNV-2 and TNV-3 circuits.....:		N
	Test with test finger .....:		N
	Test with test probe .....:		N
6.2.2.2	Battery compartments.....:		N
	Marking next to door/on door.....:		N

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Clause	**Requirement - Test**	**Result**	**Verdict**
6.3	**Protection of telecommunication network service personnel, and users of other equipment connected to telecommunication network, from hazards in equipment**		
6.3.1	Protection from hazardous voltages.....:		N
6.3.2	Use of protective earthing.....:		N
	Language of installation instructions.....:		N
6.3.3.1	Insulation between TNV circuit and parts or circuitry that will be earthed .....:		N
6.3.3.2	Exclusions .....:		N
6.3.4.1	Limitation of leakage current (mA) to telecommunication network .....:		N
6.3.4.2	Summation of leakage currents from telecommunication network .....:		N

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Clause	**Requirement - Test**	**Result**	**Verdict**
6.4	**Protection of equipment users from voltages on telecommunication networks**		
6.4.1	Separation requirements		N
6.4.2	Test procedure .....:		N
6.4.2.1	**Impulse test:** separation between TNV-1 circuits/TNV-3 circuits and .....:		N
a)	Unearthed conductive parts/non-conductive parts of equipment expected to be held or touched during normal use; test at 2.5 kV.....:		N
b)	Parts and circuitry that can be touched by test finger except contacts of connectors that cannot be touched by test probe; test at 1.5 kV.....:		N
c)	circuitry which is provided for connection of other equipment; test at 1.5 kV.....:		N
6.4.2.2	**Electric strength test:** separation between TNV-1 circuit/TNV-3 circuit and: .....:		N
a)	unearthed conductive parts/non-conductive parts of equipment expected to be held or touched during normal use; test at 1.5 kV.....:		N
b)	parts and circuitry that can be touched by test finger except contacts of connectors that cannot be touched by test probe; test at 1.0 kV.....:		N
c)	circuitry which is provided for connection of other equipment; test at 1.0 kV.....:		N
6.4.2.3	**Compliance criteria**		N
6.5	**Protection of the telecommunication wiring system from overheating**		
	Maximum continuous output current (A) .....:		N

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Clause	**Requirement – Test**	**Verdict**

A	**APPENDIX A**	**Verdict**
A.1	Flammability test for fire enclosures of moveable equipment having a total mass exceeding 18 kg, and of stationary equipment	N
A.2	Flammability test for fire enclosures of moveable equipment having a total mass not exceeding 18 kg, and for materials located within fire enclosures	N
A3	High current arcing ignition test	N
A4	Hot wire ignition test	N
A5	Hot flaming oil test	N
A6	Flammability test for V-0, V-1 or V-2	N
A7	Flammability test for HF-1, HF-2 or HBF	N
A8	Flammability test for HB	N
A9	Flammability test for 5 V	N

H	**APPENDIX H**		**Verdict**
	Ionizing radiation .....:		N
	Measured radiation .....:		N
	Measured high-voltage .....:		N
	Measured focus voltage .....:		N
	CRT markings .....:		N
	Approved by .....:		N
	Publication used .....:		N

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Clause	**Requirement - Test**	**Result**	**Verdict**

1.5.1	**TABLE: list of critical components**			
Object/Part No	Manufacturer/ trademark	Type/model	Technical data	Mark(s) of conformity
Mains Fused Input Terminal Block	Camden Electronics	CMFTB3	13A 250V	BSI Report No 4519621
Mains Input Fuse	Bussmann	5mm X 20mm Glass	F1.6A L250V	Tested in application
	Camden Electronics	5mm X 20mm Glass	F1.6A L250V	BSI Report No 4519621
Toroidal Isolating Transformer	AM Transformers Ltd	100/30A	Reinforced insulation	BSI Report No 222/4427388 & tested in application
Insulating Tape on Transformer	Dupont	PETP Mylar A	10mm wide 0.05mm thick	BSI Report No 222/4427388
F7 (PTC) on PCB	Bourns Electronics (Taiwan) Ltd	MF-R400	4 Amp 30V	BSI Report No 222/4427388 & Tested in application
Battery Fuse	Bussmann	5mm x 20mm Glass	F3.15A L250V	BSI Report No 222/4427388 & Tested in application
Batteries	Yuasa	NP7-12	12V 7Ah	BSI Report No 222/4427388 & Tested in application

2.9.2/2.9.3	**TABLE: clearance and creepage distance measurements**					
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)
Toroidal Isolating Transformer Primary – Secondary via 3 layers of interleaved insulation	354	250	4.0	7.5	5.0	7.5
Toroidal Isolating Transformer Primary – Secondary (termination of primary winding)	354	250	4.0	5.67	5.0	5.67
Terminal Block Primary – Earth	354	250	2.0	>5.0	2.5	>5.0

2.9.4	**TABLE: distance through insulation measurements**			
Distance through insulation di at/of:	U r.m.s. (V)	Test voltage (V)	Required di (mm)	di (mm)
Primary Wire on Toroidal Isolating Transformer	250	3000	0.4	0.72
Insulating tape on isolating transformer	250	3000	0.4	3 Layers

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Clause	**Requirement - Test**	**Result**	**Verdict**

5.1	**TABLE: temperature measurements**		
	Test voltage (V) ..... :	See below	-
	Ambient temperature (ºC) ..... :	24	-
	Tmra (ºC)..... :	40	-

Temperature rise dT of part/at:	207V dT (K)	253V dT (K)	Permitted dT (K)
Mains Input Terminal	18.0	18.5	80
Isolating Transformer	43.9	34.8	70 Class B
Bridge Rectifier	29.3	25.0	-
Capacitor C136	27.1	26.9	65
Inductor L1 (secondary)	27.0	55.6	60
Batteries	5.4	4.6	-
External Top Surface	12.4	10.9	30
External Front Surface	8.4	7.9	30

5.3	**TABLE: electric strength measurements**	
Test voltage applied between:	Test voltage (Vac)	Result
Isolating Transformer Primary – Secondary	3000	Pass
Mylar Insulating tape on Transformer – 2 Layers	3000	Pass
Equipment - Primary – SELV conducted in this submission	3000	Pass
Equipment - Primary – Earth conducted in this submission	1500	Pass

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Clause	**Requirement - Test**	**Result**	**Verdict**

5.4	**TABLE: fault condition tests**		
	Ambient temperature (ºC).....:	23	-
	Manufacturer of power supply.....:	Kentec	-
	Rated markings of power supply.....:	230V ac	-

No	Component No	Fault	Test voltage	Test time	Fuse No	Fuse current	Result
1	Enable Control Key	False Alarm	254V	1 Hr	-	-	Adjusted Enable control Key to perform continuous Alarm. Maximum temperature rise measured on transformer was 68.05°C. No Hazards
2	24V output – Test conducted in this submission	Over Load	254V	2hrs 40 min	F7	4A	Over loaded the 24V output to draw a maximum of 3.6A. Maximum temperature rise measured on transformer was 141.8°C. Output increased to 3.8A, PTC F7 operated within 10 minutes. No Hazards.
3	24V output	Short Circuit	207V	Instant	F7	4A	On application of fault, the PTC F7 operated and also the battery Fuse F3.15A operated. No Hazards.
4	Cap C131	Short Circuit	254V	Instant	Input fuse	1.6A	The Mains input fuse in the terminal block operated. Unit operated via batteries. No Hazards
5	Cap C146	Short Circuit	207V	25 Min	-	-	No 5V output. Temperature on Transformer was 35.3°C & REG2 was 123.9°C. No Hazards
6	Cap C135	Short Circuit	254V	Instant	F7	4A	On application of fault PTC F7 operated. Unit operated via batteries. No hazards
8	Diode D32	Short Circuit	207V	Instant	F7	4A	On application of fault PTC F7 operated. Unit operated via batteries. No hazards

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Clause	**Requirement - Test**	**Result**	**Verdict**

5.4	**TABLE: fault condition tests**		
	Ambient temperature (ºC).....:	23	-
	Manufacturer of power supply.....:	Kentec	-
	Rated markings of power supply.....:	230V ac	-

No	Component No	Fault	Test voltage	Test time	Fuse No	Fuse current	Result
8	REG1 pin 1 to 2	Short Circuit	254V	30 Min	-	-	Output voltage on 24V rail measured 40V, voltage on battery measured 26V. No excessive temperatures measured. No Hazards.
9	Bridge Rectifier ~ to +	Short Circuit	207V	Instant	Input Fuse	1.6A	The Mains input fuse in the terminal block operated. Unit operated via batteries. No Hazards

The component designation have been changed above to represent the circuit in this submission.

5.4.10	**TABLE: ball pressure test of thermoplastics**	
Required impression diameter (mm) ≤2 mm		-
Part	Test temperature (ºC)	Impression diameter (mm)
Mains Input Terminal Block	125	0.99