

TEST REPORT

EN 60335-1

Household and similar electrical appliances

Part 1: General requirements

Report reference No: TK-CL100151

Tested by
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Date of issue: January/03/2011

Number of pages (Report).....: 28 pages



Testing Laboratory Name: KES Co., Ltd.

Address: C-3701 Dongil Techno Town, 889-1, Gwanyang2-dong, Dongan-gu, Anyang-city Gyeonggi-do, 431-716, KOREA

Testing location: As above

Address: As above

Applicant's Name: DAEWOO ENERTEC Co., Ltd.

Address: 148-21, Namsan-Dong, Jung-Gu, Daegu, Rep. of Korea
(Zip Code : 700-831)

Test specification

Standard: EN 60335-1:2002+A1:2004+A11:2004,+A2:2006,+A12:2006

Test procedure: -

Procedure deviation: N.A.

Non-standard test method: N.A.

Test Report Form No......: IECEN60335_1B

TRF originator: SGS Fimko Ltd

Master TRF: dated 2003-03

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Test item description: Temperature Controller (Include in Heating Cable)



Trademark / Brand Name:

Manufacturer's Name: As applicant

Model and/or type reference: DW25W

Serial number: N/A

Rating(s): AC 230 V, 50/60 Hz

Copy of marking plate

LABEL Location



(Controller)



(Heat Cable)

(Main Label: DW25W)

Summary of testing:

- Tma(maximum ambient temperature): 40 °C

Particulars: test item vs. test requirements

Equipment mobility: Movable
 Operating condition: continuous
 Mains supply tolerance (%): -
 Tested for IT power systems: No
 IT testing, phase-phase voltage (V): No
 Class of equipment: Class II
 Mass of equipment (kg): 0,4 kg (without accessories)
 Protection against ingress of water: IPX0

Test case verdicts

Test case does not apply to the test object : N(Not applicable)
 Test item does meet the requirement: P(Pass)
 Test item does not meet the requirement ...: F(Fail)

Testing

Date of receipt of test item: January 03, 2011
 Date(s) of performance of test: December 20, 2010 - December 30, 2010

General remarks

The test result presented in this report relate only to the object(s) tested.
 This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

General product information:

DAEWOO ENERTEC Co., Ltd., Model No: DW25W, or the "EUT" as referred to in this report is best model for Applications.

Main Specifications of EUT are:

- Input Voltage : AC 230 V, 50/60 Hz
- I/O Port : Temperature Sensor
- Temperature : 0 °C - 55 °C

Clause	Requirement – Test	Result – Remark	Verdict
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1	GENERAL		
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1.5	Components		
1.5.1	General		P
	Comply with IEC 60950 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components		P
1.5.3	Thermal controls		N
1.5.4	Transformers	-	P
1.5.5	Interconnecting cables	The interconnecting cables do not represent any hazard in the meaning of this standard.	N
1.5.6	Capacitors in primary circuits	-	P
1.5.7	Double insulation or reinforced insulation bridged by components	-	P
1.5.7.1	General		N
1.5.7.2	Bridging capacitors		N
1.5.7.3	Bridging resistors		N
1.5.7.4	Accessible parts		N
1.5.8	Components in equipment for IT power systems		N

1.6	Power interface		
1.6.1	AC power distribution systems	-	P
1.6.2	Input current	-	N
1.6.3	Voltage limit of hand-held equipment	No hand-held equipment	N
1.6.4	Neutral conductor	Class I equipment then no neutral conductor	N

1.7	Marking and instructions		
1.7.1	Power rating	The required marking is readily visible in operator access area. The required marking is located on the outside surface of the equipment	P
	Rated voltage(s) or voltage range(s) (V)	230 V AC	P
	Symbol for nature of supply, for d.c. only		N
	Rated frequency or rated frequency range (Hz) :	50/60 Hz	P

	Rated current (mA or A)	3.5 A	P
	Manufacturer's name or trademark or identification mark		P
	Type/model or type reference	DW25W	P
	Symbol for Class I equipment only	Class II equipment	N
	Other symbols		N
	Certification marks		N
1.7.2	Safety instructions	Provided in the manual	P
1.7.3	Short duty cycles		N
1.7.4	Supply voltage adjustment		N
	Methods and means of adjustment; reference to installation instructions		N
1.7.5	Power outlets on the equipment		N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)		N
1.7.7	Wiring terminals		N
1.7.7.1	Protective earthing and bonding terminals		N
1.7.7.2	Terminal for a.c. mains supply conductors		N
1.7.7.3	Terminals for d.c. mains supply conductors		N
1.7.8	Controls and indicators		N
1.7.8.1	Identification, location and marking		P
1.7.8.2	Colours		N
1.7.8.3	Symbols according to IEC 60417	Symbol (IEC60417, No.5010),  is used	P
1.7.8.4	Markings using figures		N
1.7.9	Isolation of multiple power sources		N
1.7.10	IT power distribution systems		N
1.7.11	Thermostats and other regulating devices		N
1.7.12	Language(s)	English	—
1.7.13	Durability	The marking withstands the required tests.	P
1.7.14	Removable parts	No label on removable parts	P
1.7.15	Replaceable batteries		N
	Language(s)	English	—
1.7.16	Operator access with a tool		N
1.7.17	Equipment for restricted access locations		N

2	PROTECTION FROM HAZARDS	
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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
	Test by inspection		N
	Test with test finger		N
	Test with test pin		N
	Test with test probe		N
2.1.1.2	Battery compartments		N
2.1.1.3	Access to ELV wiring		N
	Working voltage (V_{peak} or V_{rms}); minimum distance (mm) through insulation		—
2.1.1.4	Access to hazardous voltage circuit wiring		N
2.1.1.5	Energy hazards	No energy hazard in operator access area. SELV only	P
2.1.1.6	Manual controls		N
2.1.1.7	Discharge of capacitors in equipment		N
	Time-constant (s); measured voltage (V)		—
2.1.2	Protection in service access areas	No electric shock and energy hazards, SELV only	P
2.1.3	Protection in restricted access locations		N

2.2	SELV circuits		
2.2.1	General requirements		P
2.2.2	Voltages under normal conditions (V)	Within SELV limits.	P
2.2.3	Voltages under fault conditions (V).....	Within SELV limits.	P
2.2.3.1	Separation by double insulation or reinforced insulation (method 1)		N
2.2.3.2	Separation by earthed screen (method 2)		N
2.2.3.3	Protection by earthing of the SELV circuit (method 3)		N
2.2.4	Connection of SELV circuits to other circuits.....	SELV circuit are only connected to other SELV circuits	P

2.3	TNV circuits		
2.3.1	Limits		N
	Type of TNV circuits.....		—
2.3.2	Separation from other circuits and from accessible parts		N
	Insulation employed		—
2.3.3	Separation from hazardous voltages		N

	Insulation employed		—
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed		—
2.3.5	Test for operating voltages generated externally		N

2.4	Limited current circuits		
2.4.1	General requirements		P
2.4.2	Limit values		P
	Frequency (Hz)	60 Hz	—
	Measured current (mA)	39 mA	—
	Measured voltage (V)	240 V	—
	Measured capacitance (μF)	18 μF	—
2.4.3	Connection of limited current circuits to other circuits		P

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

2.6	Provisions for earthing and bonding		
2.6.1	Protective earthing	Class II equipment	P
2.6.2	Functional earthing		P
2.6.3	Protective earthing and protective bonding conductors		P
2.6.3.1	General		P
2.6.3.2	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG		—
2.6.3.3	Size of protective bonding conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG		—

2.6.3.4	Resistance (Ω) of earthing conductors and their terminations, test current (A)		P
2.6.3.5	Colour of insulation		P
2.6.4	Terminals		P
2.6.4.1	General		P
2.6.4.2	Protective earthing and bonding terminals		P
	Rated current (A), type and nominal thread diameter (mm).....		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		P
2.6.5	Integrity of protective earthing		P
2.6.5.1	Interconnection of equipment		P
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		P
2.6.5.3	Disconnection of protective earth		P
2.6.5.4	Parts that can be removed by an operator		P
2.6.5.5	Parts removed during servicing		P
2.6.5.6	Corrosion resistance		P
2.6.5.7	Screws for protective bonding		P
2.6.5.8	Reliance on telecommunication network or cable distribution system		P

2.7	Overcurrent and earth fault protection in primary circuits		
2.7.1	Basic requirements		P
	Instructions when protection relies on building installation		P
2.7.2	Faults not covered in 5.3		p
2.7.3	Short-circuit backup protection		P
2.7.4	Number and location of protective devices		P
2.7.5	Protection by several devices		P
2.7.6	Warning to service personnel		p

2.8	Safety interlocks		
2.8.1	General principles		N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches and relays		N
2.8.7.1	Contact gaps (mm)		N

2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N

2.9	Electrical insulation		
2.9.1	Properties of insulating materials	Natural rubber, materials containing asbestos and hygroscopic materials are not used as insulation	P
2.9.2	Humidity conditioning		N
2.9.3	Grade of insulation		N

2.10	Clearances, creepage distances and distances through insulation		
2.10.1	General	Functional insulation, See 5.3.4	P
2.10.2	Determination of working voltage		P
2.10.3	Clearances		P
2.10.3.1	General		P
2.10.3.2	Clearances in primary circuits		P
2.10.3.3	Clearances in secondary circuits		P
2.10.3.4	Measurement of transient voltage levels		P
2.10.4	Creepage distances		P
	CTI tests		—
2.10.5	Solid insulation		P
2.10.5.1	Minimum distance through insulation		P
2.10.5.2	Thin sheet material		N
	Number of layers (pcs)		—
	Electric strength test		—
2.10.5.3	Printed boards		P
	Distance through insulation		P
	Electric strength test for thin sheet insulating material		—
	Number of layers (pcs)	4 pcs	-
2.10.5.4	Wound components		N
	Number of layers (pcs)		N
	Two wires in contact inside wound component; angle between 45° and 90°		N
2.10.6	Coated printed boards		N
2.10.6.1	General		N
2.10.6.2	Sample preparation and preliminary inspection		N

2.10.6.3	Thermal cycling		N
2.10.6.4	Thermal ageing (°C)		N
2.10.6.5	Electric strength test		—
2.10.6.6	Abrasion resistance test		N
	Electric strength test		—
2.10.7	Enclosed and sealed parts		N
	Temperature $T_1 = T_2 + T_{ma} - T_{amb} + 10K$ (°C).....		N
2.10.8	Spacings filled by insulating compound.....		N
	Electric strength test		—
2.10.9	Component external terminations		N
2.10.10	Insulation with varying dimensions		N

3	WIRING, CONNECTIONS AND SUPPLY	
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3.1	General		
3.1.1	Current rating and overcurrent protection		P
3.1.2	Protection against mechanical damage	Smooth wireway and free from edges.	P
3.1.3	Securing of internal wiring		P
3.1.4	Insulation of conductors		N
3.1.5	Beads and ceramic insulators		N
3.1.6	Screws for electrical contact pressure	No screws for electric contact.	N
3.1.7	Insulating materials in electrical connections		N
3.1.8	Self-tapping and spaced thread screws		N
3.1.9	Termination of conductors		N
	10 N pull test		N
3.1.10	Sleeving on wiring	No sleeving on wiring	N

3.2	Connection to an a.c. mains supply or a d.c. mains supply		
3.2.1	Means of connection		P
3.2.1.1	Connection to an a.c. mains supply		P
3.2.1.2	Connection to a d.c. mains supply		P
3.2.2	Multiple supply connections	No multiple supply connections used.	P
3.2.3	Permanently connected equipment		P
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4	Appliance inlets		P
3.2.5	Power supply cords		N
	Type		—

	Rated current (A), cross-sectional area (mm ²), AWG.....:		—
3.2.6	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage		N
3.2.8	Cord guards		N
	D (mm); test mass (g)		—
	Radius of curvature of cord (mm)		—
3.2.9	Supply wiring space		N

3.3	Wiring terminals for connection of external conductors		
3.3.1	Wiring terminals		P
3.3.2	Connection of non-detachable power supply cords		P
3.3.3	Screw terminals		P
3.3.4	Rated current (A), cord/cable type, cross-sectional area (mm ²).....:		N
3.3.5	Rated current (A), type and nominal thread diameter (mm)		—
3.3.6	Wiring terminals design		P
3.3.7	Grouping of wiring terminals		P
3.3.8	Stranded wire		P

3.4	Disconnection from the mains supply		
3.4.1	General requirement	Class II equipment	P
3.4.2	Disconnect devices		P
3.4.3	Permanently connected equipment		P
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords		N
3.4.6	Single-phase equipment and d.c. equipment		N
3.4.7	Three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N

3.5	Interconnection of equipment		
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits	SELV circuit only.	P

3.5.3	ELV circuits as interconnection circuits		N
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4	PHYSICAL REQUIREMENTS	
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4.1	Stability		
	Angle of 10°	Not floor-standing equipment.	P
	Test: force (N)	As above.	P

4.2	Mechanical strength		
4.2.1	General	Equipment has adequate mechanical strength and is so constructed as to remain safe.	P
4.2.2	Steady force test, 10 N		P
4.2.3	Steady force test, 30 N		P
4.2.4	Steady force test, 250 N		P
4.2.5	Impact test		N
	Fall test		N
	Swing test		N
4.2.6	Drop test	1 m, No hazard	P
4.2.7	Stress relief test	75 °C	P
4.2.8	Cathode ray tubes		N
	Picture tube separately certified		N
4.2.9	High pressure lamps		N
4.2.10	Wall or ceiling mounted equipment; force (N) ...:		N

4.3	Design and construction		
4.3.1	Edges and corners	All edges and corners are rounded and/or smoothed	P
4.3.2	Handles and manual controls; force (N)		N
4.3.3	Adjustable controls		N
4.3.4	Securing of parts		N
4.3.5	Connection of plugs and sockets		N
4.3.6	Direct plug-in equipment		N
	Dimensions (mm) of mains plug for direct plug-in		N
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N)		N
4.3.7	Heating elements in earthed equipment		N
4.3.8	Batteries		N
4.3.9	Oil and grease		N

4.3.10	Dust, powders, liquids and gases		N
4.3.11	Containers for liquids or gases		N
4.3.12	Flammable liquids		N
	Quantity of liquid (l)		N
	Flash point (°C)		N
4.3.13	Radiation; type of radiation		N
4.3.13.1	General		N
4.3.13.2	Ionizing radiation		N
	Measured radiation (pA/kg)		—
	Measured high-voltage (kV)		—
	Measured focus voltage (kV)		—
	CRT markings		—
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N
4.3.13.5	Laser (including LEDs)		N
	Laser class		—
4.3.13.6	Other types		N

4.4	Protection against hazardous moving parts		
4.4.1	General		N
4.4.2	Protection in operator access areas		N
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		N

4.5	Thermal requirements		
4.5.1	Maximum temperatures	(see appended table 4.5)	P
	Normal load condition per Annex L		P
4.5.2	Resistance to abnormal heat		N

4.6	Openings in enclosures		
4.6.1	Top and side openings		P
	Dimensions (mm)	No openings	—
4.6.2	Bottoms of fire enclosures		P
	Construction of the bottom	No openings	—
4.6.3	Doors or covers in fire enclosures		N
4.6.4	Openings in transportable equipment		N
4.6.5	Adhesives for constructional purposes		N

	Conditioning temperature (°C)/time (weeks)		—
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4.7	Resistance to fire		
4.7.1	Reducing the risk of ignition and spread of flame	Method 1 is used	P
	Method 1, selection and application of components wiring and materials		P
	Method 2, application of all of simulated fault condition tests		N
4.7.2	Conditions for a fire enclosure		P
4.7.2.1	Parts requiring a fire enclosure		N
4.7.2.2	Parts not requiring a fire enclosure		P
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures	No fire enclosure required	N
4.7.3.3	Materials for components and other parts outside fire enclosures	see appended table 1.5.1	P
4.7.3.4	Materials for components and other parts inside fire enclosures	see appended table 1.5.1	P
4.7.3.5	Materials for air filter assemblies		N
4.7.3.6	Materials used in high-voltage components		N

5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		
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5.1	Touch current and protective conductor current		
5.1.1	General		P
5.1.2	Equipment under test (EUT)		P
5.1.3	Test circuit		N
5.1.4	Application of measuring instrument		N
5.1.5	Test procedure		N
5.1.6	Test measurements		N
	Test voltage (V)	230 V	-
	Measured touch current (mA)	2.7 mA	—
	Max. allowed touch current (mA)	2.9 mA	—
	Measured protective conductor current (mA)	Class II equipment	—
	Max. allowed protective conductor current (mA) :	Class II equipment	—
5.1.7	Equipment with touch current exceeding 3.5 mA		N
5.1.8	Touch currents to and from telecommunication networks and cable distribution systems and from telecommunication networks		N

5.1.8.1	Limitation of the touch current to a telecommunication network and a cable distribution system		N
	Test voltage (V)		—
	Measured touch current (mA)		—
	Max. allowed touch current (mA)		—
5.1.8.2	Summation of touch currents from telecommunication networks		N

5.2	Electric strength		
5.2.1	General		P
5.2.2	Test procedure		P

5.3	Abnormal operating and fault conditions		
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors		N
5.3.3	Transformers		N
5.3.4	Functional insulation		P
5.3.5	Electromechanical components		N
5.3.6	Simulation of faults		P
5.3.7	Unattended equipment		N
5.3.8	Compliance criteria for abnormal operating and fault conditions		N

6	CONNECTION TO TELECOMMUNICATION NETWORKS		
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6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		
6.1.1	Protection from hazardous voltages		P
6.1.2	Separation of the telecommunication network from earth		P
6.1.2.1	Requirements	(see appended table 5.2)	P
	Test voltage (V)	230 V	—
	Current in the test circuit (mA)	29 mA	—
6.1.2.2	Exclusions		P

6.2	Protection of equipment users from overvoltages on telecommunication networks		
6.2.1	Separation requirements		P
6.2.2	Electric strength test procedure		P
6.2.2.1	Impulse test	(see appended table 5.2)	N

6.2.2.2	Steady-state test	(see appended table 5.2)	N
6.2.2.3	Compliance criteria		P

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

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

A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE	
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)	
A.1.1	Samples	—
	Wall thickness (mm).....	—
A.1.2	Conditioning of samples; temperature (°C)	N
A.1.3	Mounting of samples	N
A.1.4	Test flame (see IEC 60695-11-3)	N
	Flame A, B, C or D	—
A.1.5	Test procedure	N
A.1.6	Compliance criteria	N
	Sample 1 burning time (s).....	—
	Sample 2 burning time (s).....	—
	Sample 3 burning time (s).....	—

A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)	
A.2.1	Samples, material	—
	Wall thickness (mm).....	—

A.2.2	Conditioning of samples		N
A.2.3	Mounting of samples		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C		—
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s).....		—
	Sample 2 burning time (s).....		—
	Sample 3 burning time (s).....		—
A.2.7	Alternative test acc. to IEC 60695-2-2, cl. 4 and 8		N
	Sample 1 burning time (s).....		—
	Sample 2 burning time (s).....		—
	Sample 3 burning time (s).....		—

A.3	Hot flaming oil test (see 4.6.2)		
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

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

B.8	Test for motors with capacitors	(see appended table 5.3)	N
B.9	Test for three-phase motors	(see appended table 5.3)	N
B.10	Test for series motors		N
	Operating voltage (V) :		—

C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		
	Position :		—
	Manufacturer :		—
	Type :		—
	Rated values :		—
	Method of protection :		—
C.1	Overload test	(see appended table 5.3)	N
C.2	Insulation	(see appended table 5.2)	N
	Protection from displacement of windings :		N

D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		
D.1	Measuring instrument		N
D.2	Alternative measuring instrument		N

E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		N
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F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10)		N
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G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		
G.1	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V) :		N
G.2.1	AC mains supply		N
G.2.2	DC mains supply		N
G.3	Determination of telecommunication network transient voltage (V)..... :		N
G.4	Determination of required withstand voltage (V) :		N
G.5	Measurement of transient levels (V) :		N
G.6	Determination of minimum clearances :		N

H	ANNEX H, IONIZING RADIATION (see 4.3.13)		N
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J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal used		—

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

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

M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
M.3.1.1	Frequency (Hz)		—
M.3.1.2	Voltage (V)		—
M.3.1.3	Cadence; time (s), voltage (V)		—
M.3.1.4	Single fault current (mA)		—
M.3.2	Tripping device and monitoring voltage		N
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N

N	ANNEX N, IMPULSE TEST GENERATORS (see 2.10.3.4, 6.2.2.1, 7.3.2 and clause G.5)		
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N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N
P	ANNEX P, NORMATIVE REFERENCES		N
Q	ANNEX Q, BIBLIOGRAPHY		N
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6)		N
R.2	Reduced clearances (see 2.10.3)		N
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N
		See separate test report	—
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N
		See separate test report	—
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		N
V.1	Introduction		N
V.2	TN power distribution systems		N
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		N
W.1	Touch current from electronic circuits		N
W.1.2	Earthed circuits		N
W.2	Interconnection of several equipments		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N
W.2.3	Common return, connected to protective earth		N
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)		N

X.1	Determination of maximum input current		N
X.2	Overload test procedure		N

Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		N
Y.1	Test apparatus		N
Y.2	Mounting of test samples		N
Y.3	Carbon-arc light-exposure apparatus		N

EN 60 950-1						
1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
AC Filter(Noise)	WZERA Inc.	-	IH-0242-S	-	UL	
PCB	OIU	-	2-LEYER 1.6T	-	UL, VDE	

¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance

1.6.2	TABLE: electrical data (in normal conditions)					P
fuse #	Irated (mA)	U (V)	P (W)	I (mA)	Ifuse (mA)	condition/status
-	3500	12	8.1	674	-	Maximum data transmission mode

2.10.3 and 2.10.4	TABLE: clearance and creepage distance measurements						N
clearance cl and creepage distance dcr at/of:	Up (V)	U r,m,s, (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	
Transformer Primary to Selv	457	241	4.5	5.6	4.2	3.9	

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

4.5	TABLE: maximum temperatures			P
	test voltage (V)	254 Vdc	-	—
	t _{amb1} (°C)	23,3	-	—
	t _{amb2} (°C)	21,9	-	—
maximum temperature T of part/at::		T (°C)		allowed T _{max} (°C)
Enclosure		35,8	-	75
Enclosure body		39,5	-	75
NOTE)				
- Based on temperature non-dependent equipment				
- Tma = 40 °C				
- Test condition: Maximum data transmission mode				

4.5.2	TABLE: ball pressure test of thermoplastic parts			N
	allowed impression diameter (mm)	≤ 2 mm		—
part		test temperature (°C)	impression diameter (mm)	
CN1		70	0.9	

4.7	TABLE: resistance to fire				P
Part	manufacturer of material	type of material	thickness (mm)	flammability class	
Enclosure	Cheil Industries Inc.	HF-1023+	Min. 0,8	V-0, 80 °C	
Enclosure	LG chemical	LUPOX GP-2306F(#), LUPOX DGP- 2306F(#)	Min. 0,8	V-0, 140 °C	

5.2	TABLE: electric strength tests and impulse tests			N
test voltage applied between:		test voltage (V)	breakdown Yes / No	
supplementary information				
5.3	TABLE: fault condition tests			P
	ambient temperature (°C)	See below		—
	model/type of power supply	-		—
	manufacturer of power supply	-		—

Photograph

TOP and bottom view





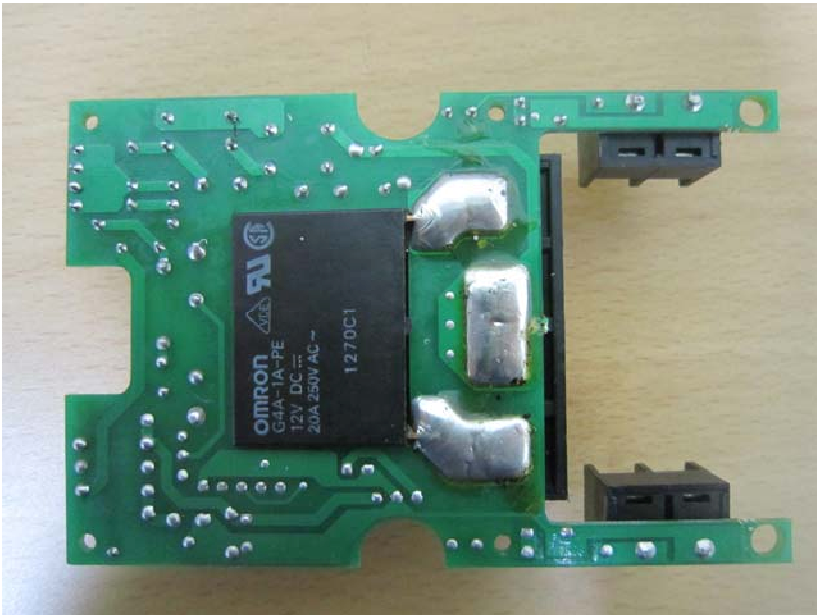
Internal view 1



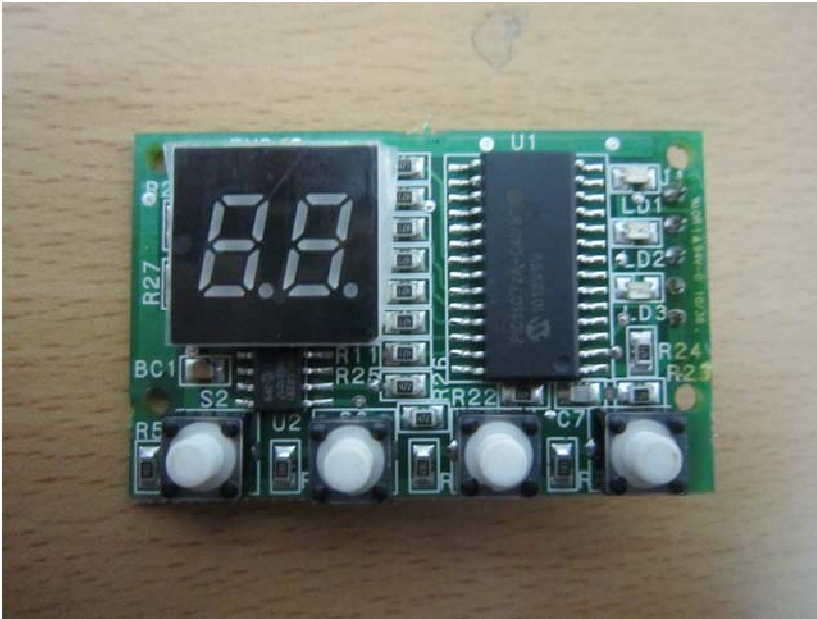
Internal view -2



Internal view -3



Internal view -4



Internal view -5

