TEST REPORT

IEC 60950-1 and/or EN 60950-1, First Edition

Information technology equipment – Safety – Part 1: General requirements

Report reference No	1022.01
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Approved by (printed name and signature)	Mr. Alois Ehrmeier
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Testing Laboratory Name	Kontron Embedded Computers GmbH
Address	Oskar-von-Miller-Str.1
	85386 Eching
Testing location	CBTL ☐ CCATL ☐ SMT ☐ TMP ☐
Address	Same as above

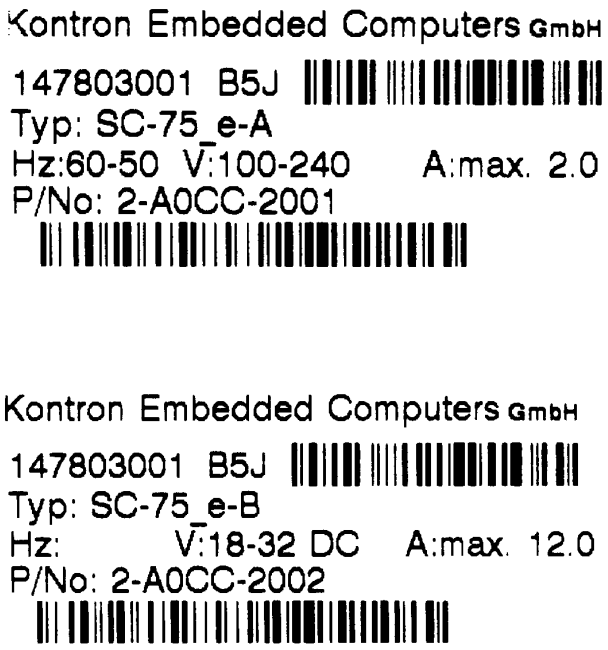
Applicant's Name	Kontron Embedded Computers GmbH
Address	Oskar-von-Miller-Str.1
	85386 Eching

Test specification	
Standard	IEC 60950-1:2001 and/or EN 60950-1:2001, First Edition
Test procedure	CB/CCA –scheme
Non-standard test method	--

Test Report Form No	IECEN60950_1A
TRF originator	SGS Fimko Ltd
Master TRF	dated 2002-03

Test item description	Industrial Computer
Trademark	Kontron
Manufacturer	Kontron Embedded Computers GmbH
Model and/or type reference	**SC-75_e – X** (The character X represents the type of PSU and can be any letter from A to Z)
Serial number	Pre-production units
Rating(s)	Type – **A** : 100-240 VAC; 60-50 Hz; max. 2.0 A Type – **B** : 18-32 VDC; max.12 A

Copy of marking plate:



Summary of testing:

Test item is in compliance with IEC/EN 60950-1:2001 standard.

Clause 1.6.2	Power Input Measurements
Clause 1.7.1	Power Rating
Clause 2.1.1.1	Accessibility to Energized parts
Clause 2.2	SELV circuits – voltage measurements (normal and fault conditions)
Clause 2.5	Limited power sources
Clause 2.6.3.4	Resistance of earthing conductors and ttheir terminations
Clause 2.9.2	Humidity conditioning test
Clause 4.1	Stability
Clause 4.2	Mechanical strength test
Clause 4.5	Thermal requirements
Clause 4.6	Openings in enclosures
Clause 5.1	Touch current and protective conductor current measurements
Clause 5.2	Electric strength
Clause 5.3	Abnormal operating and fault conditions tests

Particulars: test item vs. test requirements	
Equipment mobility .....:	stationary / fixed / for building-in
Operating condition .....:	continuous
Mains supply tolerance (%).....:	-10/ +6 %
Tested for IT power systems .....:	No
IT testing, phase-phase voltage (V) :	N/A
Class of equipment .....:	AC Model SC-75_e – A: Class I
	DC Model SC-75_e – B: Class II
Mass of equipment (kg) .....:	Approx. 6,2 kg
Protection against ingress of water .....:	ordinary
Test case verdicts	
Test case does not apply to the test object :	N/A
Test item does meet the requirement .....:	P(ass)
Test item does not meet the requirement ....:	F(ail)
Testing	
Date of receipt of test item .....:	07.04.06
Date(s) of performance of test .....:	07.04.06

General remarks

"This report is not valid as a CB Test Report unless appended by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02".

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:

The Kontron Computer SC-75_e offers Pentium M power up to 1.8 GHz. 3 Free PCI slots and optional Long Distance Interface make SC-75_e an excellent solution for Industrial applications with a Long Distance Interface for Displays Wall Mount.

Within this test report always the stronger test requirements were taken under consideration!

(1) The Power Supplies (PSUs)

All computer types are powered by internal installed Switch Mode Power Supplies (PSUs)

- Integrated AC wide range or DC 24 V PSUs
- Those PSUs are certified in accordance with EN 60950-1, IEC 60950-1 and UL 60950-1.
- Input of PSUs is either DC (< 60 VDC) or AC (100-240 VAC)
- All PSU-Outputs fulfill SELV conditions
- All PSUs fulfill requirements regarding operator protection, against contact with hazardous live parts

For more PSU-Information please refer to table " list of critical component "

(2) Series, SC-75_e type designation:

- AC Model SC-75_e – A
- DC Model SC-75_e – B

AC-Model: 2-A0CC-X001 as well as DC Model: 2-A0CC-X002 with KONTRON ePCI-101 CPU Board with Intel´s latest low power processor, the Pentium-M 1,6 GHz and low profile passive CPU cooling. FSB of 400MHz with the 855GME chipset delivers outstanding performance. By providing six high-speed USB 2.0 channels and two Ethernet interfaces the ePCI-101 supports comprehensive connectivity features.

Following types were tested within this investigation:

The character X represents the type of PSU and can be any letter from A to Z. The list of critical components shows all types of already tested PSUs and includes a reference list of letters A to Z and belonging PSU ! Each Series can be individually equipped with components like CPU-Boards, drives, interface cards, e.g. as long as the components are mentioned in the list of critical components or correspond with described requirements.

(3) Technical Data:

SC-75_e – A Model Type: 2-A0CC-2001

Input: 100 - 240 VAC
60 - 50 Hz
max. 2 A

SC-75_e – B Model Type: 2-A0CC-2002

Input: 18 - 32 VDC
max. 12 A

(4) Insulation system (Type: 2-A0CC-2001)

There are Mains- and SELV-Circuits. Following insulation systems are existing:

A) Mains to PE ---> Required, Basic Insulation (BI)

Fulfilled by the use of certified PSU

B) Mains to SELV ---> Required, Reinforced Insulation (RI)

Fulfilled by the use of certified PSU

C) Operational Insulation

The compliance of this insulation system was evaluated within belonging investigation

(5) Protection against contact with hazardous live parts and hazardous energy.
(Type: 2-A0CC-2001)

- Inside the computer it is not possible to get in contact with hazardous live parts. But because of hazardous energy (chapter 1.2.8.7, hazardous energy) only authorised persons are allowed to open computer. Within operation manual safety hints point out that operator access to unit inner side is not allowed.

(6) Test conditions (Type: 2-A0CC-2001 and 2-A0CC-2002)

- Within this test report all PSUs were taken under consideration. A self test program took care that computer and peripherals were steady running under max. working conditions. All standard tests were conducted with a maximum equipped computer-system (basic unit configuration). Where necessary (for instance chapters heating tests, single fault condition tests) extra tests where performed in order to show the standard compliance of options/peripherals not used in basic unit configuration.

Via the term

Following is an overview regarding the measured power consumption of basic unit configuration:

Type: 2-A0CC-2001 and 2-A0CC-2002

a) Mother Board ----> 37 W
b) All Drives/Peripherals ----> 30 W
c) Additional Power * ----> P

* = The total secondary loading power depends on the output data of the PSUs. For testing the output power requirements, given by the PSUs-Data sheets (technical data sheets, certificates), were taken into consideration.

“ Additional Power (P) = permitted max. Secondary-Output minus power of all drives/peripherals “, that means: -Power (X) minus worst CPU-Boards-Power

Additional power (P) was simulated with special electronic load PCI- Interface boards (trademark KONTRON) inside the unit. Each PCI – Interface board creates electronic load of max. 25 W.

X and P in dependence of used PSU-Type:

X and P from 2-A0CC-2001 in dependence of used PSU-Type:

PSU-Type A	---->	X = 180	as a result	P = 113 W
PSU-Type B	---->	X = 150	as a result	P = 83 W

The values in brackets represent the additional permitted power (P) for dual CPU-Use.

Additional power (P) was simulated with resistors mounted on interface boards inside the units.

Within operation manual it is defined:

a. that the total power of all interfaces is not allowed to exceed, dependent on computer type, down mentioned value of P
b. the power of each used interface (ISA or PCI) should not be higher than 25 W
c. Maximum continuous total DC output power for PSU Type -A (2-A0CC-2001) should not exceed 175 W.
d. The PSU Type -A (2-A0CC-2001) output load at +3,3V and +5V together must not exceed 61 W Max.
e. The PSU Type -B (2-A0CC-2002) output load at +3,3V and +5V together must not exceed 85 W Max.
f. The PSU Type -B (2-A0CC-2002) output load at +3,3V; +5V and +12V together must not exceed 135 W Max.
g. always taking care that the cooling openings of the unit are free for unhindered stream of air.
h. System must provide minimum 1,7 m/s airflow velocity (34 CFM or 57,8 m^3/h) for 50°C environment if the heat sink without fan is used.
i. Use only this operating systems that support the **Advanced Configuration and Power Interface (ACPI)**, industrial standard for the computer energy menagement.
j. User may the BIOS default Power/ACPI Control Sub-Menu CPU setting ”TM2” (Thermal Monitor 2) not changing! Seting this bit enable thermal control Circuit (TCC) portion of the Thermal Monitor of the CPU.

(7) SELV Circuits (Safety)

Extra-Low Voltage (SELV) circuits are ports that have maximum DC working voltage level less than 60 V (42.4 VAC). In addition, the ports must not be connected to telecommunication networks as defined in EN 60950 (see CEI/ IEC 60950-1 2001-10, standard clause 1.2.13.8).

In practice, the electrical cables do not exit the building. Electrical cables connect to equipment that meets one of the following requirements:

- Installed in the RAL (Restricted Access Location)
- Does not have electrical cables that exit the building unless those ports are TNV (Telecommunication Networks Voltage) circuits
- Has a written consent (or in other evidence) that its connecting port towards the SELV circuit port is not a telecommunication network

After installation in a non-RAL location, all communication ports must be connected to SELV circuits, for example, a port on a personal computer or 10/100-Mb Ethernet hub/router or other information technology (IT) equipment.

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
1	GENERAL		P
1.5	Components		P
1.5.1	General		P
	Comply with IEC 60950 or relevant component standard	(see appended table 1.5.1; list of critical components).	P
1.5.2	Evaluation and testing of components	All safety critical components are certified. Non-certified components were tested according to this standard.	P
1.5.3	Thermal controls		N/A
1.5.4	Transformers	Only within certified PSU	P
1.5.5	Interconnecting cables	SELV interconnecting cables for the Ethernet connection.	P
1.5.6	Capacitors in primary circuits	Only within certified PSU	P
1.5.7	Double insulation or reinforced insulation bridged by components	Only within certified PSU	P
1.5.7.1	General	Refer to above	P
1.5.7.2	Bridging capacitors		N/A
1.5.7.3	Bridging resistors		N/A
1.5.7.4	Accessible parts		N/A
1.5.8	Components in equipment for IT power systems	Power supplies have been evaluated for IT power systems	N/A
1.6	Power interface		P
1.6.1	AC power distribution systems		P
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment		N/A
1.6.4	Neutral conductor		P
1.7	Marking and instructions		P
1.7.1	Power rating		P
	Rated voltage(s) or voltage range(s) (V)	With PSU Type –A: 100-240 VAC With PSU Type –B: 18 – 32 VDC	P
	Symbol for nature of supply, for d.c. only		N/A
	Rated frequency or rated frequency range (Hz) ..	With PSU Type –A: 60 - 50 Hz	P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
	Rated current (mA or A)	With PSU Type –A: max. 2 A With PSU Type –B: max. 12 A	P
	Manufacturer's name or trademark or identification mark	kontron	P
	Type/model or type reference.....	**SC-75_e – X**	P
	Symbol ~~of~~ for Class II equipment only		N/A
	Other symbols		N/A
	Certification marks		N/A
1.7.2	Safety instructions	Safety instructions sufficient explained in operation manual	P
1.7.3	Short duty cycles		N/A
1.7.4	Supply voltage adjustment		N/A
1.7.5	Power outlets on the equipment		N/A
	Methods and means of adjustment; reference to installation instructions:		N/A
1.7.6	Fuse identification	• Non operator replaceable fuse! • Non operator replaceable: PTC's on CPU-Boards and fuses within certified PSUs. Technical unit documentation provided with sufficient information	P
1.7.7	Wiring terminals		P
1.7.7.1	Protective earthing and bonding terminals	Within certified AC-PSUs appliance inlet	P
1.7.7.2	Terminal for a.c. mains supply conductors		N/A
1.7.7.3	Terminals for d.c. mains supply conductors		N/A
1.7.8	Controls and indicators		N/A
1.7.8.1	Identification, location and marking		N/A
1.7.8.2	Colours		N/A
1.7.8.3	Symbols according to IEC 60417		N/A
1.7.8.4	Markings using figures		N/A
1.7.9	Isolation of multiple power sources		N/A
1.7.10	IT power distribution systems		N/A
1.7.11	Thermostats and other regulating devices		N/A
1.7.12	Language		—
1.7.13	Durability		P
1.7.14	Removable parts		N/A
1.7.15	Replaceable batteries	Only lithium battery on CPU boards	P
	Language.....		—

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
1.7.16	Operator access with a tool.....		N/A
1.7.17	Equipment for restricted access locations.....		N/A

2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas	However hazardous voltage circuits are only within certified PSUs. The PSU-Enclosures together with Kontron internal PSU-Enclosure modifications fulfils all requirements of this chapter. Operator access to SELV only	P
2.1.1.1	Access to energized parts	Only qualified or authorize personal is allowed to has access to unit inner side because of hazardous energy level (>240 VA) supply of used PSUs. Within operation manual the user is informed that the access to unit inner side is not allowed! No access to other hazardous or ELV parts.	N/A
	Test by inspection	Protection is established by insulation materials and barriers	P
	Test with test finger	No access to above mentioned parts	P
	Test with test pin	No access to above mentioned parts	P
	Test with test probe	No access to TNV circuit	N/A
2.1.1.2	Battery compartments		N/A
2.1.1.3	Access to ELV wiring		N/A
	Working voltage (V); minimum distance (mm) through insulation	(see appended table 2.10.5)	—
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage wiring in the operator access area	N/A
2.1.1.5	Energy hazards	No energy hazard in operator access area. Operator has access only to SELV area.	P
2.1.1.6	Manual controls		N/A
2.1.1.7	Discharge of capacitors in equipment	Only within certified PSUs	P
	Time-constant (s); measured voltage (V).....	< 1 sec.	—
2.1.2	Protection in service access areas	Hazardous voltage circuits are only within certified PSU. The PSU enclosure fulfill all requirements of this chapter. Only qualified or authorize personal is allowed to has access to unit inner side.	P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
2.1.3	Protection in restricted access locations		N/A
2.2	SELV circuits		P
2.2.1	General requirements	<42.4Vpk/60Vdc under normal and fault conditions	P
2.2.2	Voltages under normal conditions (V).....	Below ELV circuit limits	P
2.2.3	Voltages under fault conditions (V).....	Below ELV circuit limits	P
2.2.3.1	Separation by double insulation or reinforced insulation (method 1)	Applied in certified PSUs	P
2.2.3.2	Separation by earthed screen (method 2)	Applied in certified PSUs	N/A
2.2.3.3	Protection by earthing of the SELV circuit (method 3)		N/A
2.2.4	Connection of SELV circuits to other circuits.....	SELV-Circuits only connected with SELV-Circuits	P
2.3	TNV circuits		N/A
2.3.1	Limits		N/A
	Type of TNV circuits.....		—
2.3.2	Separation from other circuits and from accessible parts		N/A
	Insulation employed.....		—
2.3.3	Separation from hazardous voltages		N/A
	Insulation employed.....		—
2.3.4	Connection of TNV circuits to other circuits		N/A
	Insulation employed.....		—
2.3.5	Test for operating voltages generated externally		N/A
2.4	Limited current circuits		N/A
2.4.1	General requirements		N/A
2.4.2	Limit values		N/A
	Frequency (Hz).....		—
	Measured current (mA).....		—
	Measured voltage (V).....		—
	Measured capacitance (µF).....		—
2.4.3	Connection of limited current circuits to other circuits		N/A
2.5	Limited power sources		P
	Inherently limited output		P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
	Impedance limited output		N/A
	Overcurrent protective device limited output		N/A
	Regulating network limited output under normal operating and single fault condition	the following output has been evaluated and found to comply whit the limited power sources: +3,3;+5;-5;+12;-12Vdc , Vsb (of the PSU –A and – B type), USB and PS2. For details please see appended table 5.3 (fault condition tests)	P
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition	For details please see appended table 5.3 (fault condition tests)	P
	Output voltage (V), output current (A), apparent power (VA).....		—
	Current rating of overcurrent protective device (A)		—

2.6	Provisions for earthing and bonding	(already certified PSU)	P
2.6.1	Protective earthing	Applied in certified PSUs	P
2.6.2	Functional earthing		N/A
2.6.3	Protective earthing and protective bonding conductors		N/A
2.6.3.1	General	Applied in certified PSUs	P
2.6.3.2	Size of protective earthing conductors	Applied in certified PSUs	P
	Rated current (A), cross-sectional area (mm^2), AWG.....		—
2.6.3.3	Size of protective bonding conductors	Applied in certified PSUs	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).....	Only with PSU Type –A 0,05 Ω / 30 A for 2 Minutes	P
2.6.3.5	Colour of insulation	Applied in certified PSUs	P
2.6.4	Terminals	Applied in certified PSUs	P
2.6.4.1	General	Fulfilled by the use of certified PSUs	P
2.6.4.2	Protective earthing and bonding terminals	Applied in certified PSUs	P
	Rated current (A), type and nominal thread diameter (mm).....		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N/A
2.6.5	Integrity of protective earthing	Fulfilled by the use of certified PSUs	P
2.6.5.1	Interconnection of equipment		N/A
2.6.5.2	Components in protective earthing conductors and protective bonding conductors	No switches or fuses	P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
2.6.5.3	Disconnection of protective earth	Appliance inlet used	P
2.6.5.4	Parts that can be removed by an operator	Fulfilled by the use of certified PSUs	P
2.6.5.5	Parts removed during servicing	Fulfilled by the use of certified PSUs	P
2.6.5.6	Corrosion resistance		P
2.6.5.7	Screws for protective bonding		N/A
2.6.5.8	Reliance on telecommunication network or cable distribution system		N/A

2.7	Overcurrent and earth fault protection in primary circuits		P
2.7.1	Basic requirements	Fulfilled by the use of certified PSUs	P
	Instructions when protection relies on building installation	Safety instructions sufficient explained in operation manual	P
2.7.2	Faults not covered in 5.3		P
2.7.3	Short-circuit backup protection	Building Installation	P
2.7.4	Number and location of protective devices	Mains fuse within certified PSUs, not operator accessible	P
2.7.5	Protection by several devices		N/A
2.7.6	Warning to service personnel.....		N/A

2.8	Safety interlocks		N/A
2.8.1	General principles		N/A
2.8.2	Protection requirements		N/A
2.8.3	Inadvertent reactivation		N/A
2.8.4	Fail-safe operation		N/A
2.8.5	Moving parts		N/A
2.8.6	Overriding		N/A
2.8.7	Switches and relays		N/A
2.8.7.1	Contact gaps (mm)		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	(see appended table 5.2)	N/A
2.8.8	Mechanical actuators		N/A

2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	Neutral rubber, asbestos or hygroscopic materials are not used	P
2.9.2	Humidity conditioning	(see separate test reports)	P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
	Humidity (%)	Non condensing: Operating 5% - 95% Non-Operating 0% - 95%	—
	Temperature (°C)	Operating: 5°C to +50°C Non-Operating -20°C to +70°C	—
2.9.3	Grade of insulation	* RI and BI: Requirements of this chapter fulfilled by the use of EN/IEC-Approved PSUs	P
2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General	Fulfilled by the use of certified PSUs (Based on pollution degree 2 and fully enclosed power supplies).	P
2.10.2	Determination of working voltage	PSU Type –A :>90 to < 254,5 Vac, 60/50 Hz for primary. PSU Type –B: 18 – 32 Vdc	P
2.10.3	Clearances	Fulfilled by the use of certified PSUs	P
2.10.3.1	General		P
2.10.3.2	Clearances in primary circuit	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.3	Clearances in secondary circuits	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.4	Measurement of transient voltage levels		N/A
2.10.4	Creepage distances	(see appended table 2.10.3 and 2.10.4)	P
	CTI tests.....		—
2.10.5	Solid insulation		N/A
2.10.5.1	Minimum distance through insulation	(see appended table 2.10.5)	N/A
2.10.5.2	Thin sheet material		N/A
	Number of layers (pcs).....		—
	Electric strength test	(see appended table 5.2)	—
2.10.5.3	Printed boards		N/A
	Distance through insulation		N/A
	Electric strength test for thin sheet insulating material	(see appended table 5.2)	—
	Number of layers (pcs).....		N/A
2.10.5.4	Wound components		N/A
	Number of layers (pcs).....		N/A
	Two wires in contact inside wound component; angle between 45° and 90°		N/A
2.10.6	Coated printed boards		N/A
2.10.6.1	General		N/A

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
2.10.6.2	Sample preparation and preliminary inspection		N/A
2.10.6.3	Thermal cycling		N/A
2.10.6.4	Thermal ageing (°C)		N/A
2.10.6.5	Electric strength test	(see appended table 5.2)	—
2.10.6.6	Abrasion resistance test		N/A
	Electric strength test	(see appended table 5.2)	—
2.10.7	Enclosed and sealed parts		N/A
	Temperature T_1=T_2 = T_{ma} – T_{amb} +10K (°C).....		N/A
2.10.8	Spacings filled by insulating compound.....		N/A
	Electric strength test	(see appended table 5.2)	—
2.10.9	Component external terminations		N/A
2.10.10	Insulation with varying dimensions		N/A

3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection		P
3.1.2	Protection against mechanical damage		P
3.1.3	Securing of internal wiring		P
3.1.4	Insulation of conductors	(see appended table 5.2)	N/A
3.1.5	Beads and ceramic insulators		N/A
3.1.6	Screws for electrical contact pressure		N/A
3.1.7	Insulating materials in electrical connections		N/A
3.1.8	Self-tapping and spaced thread screws		N/A
3.1.9	Termination of conductors		N/A
	10 N pull test		N/A
3.1.10	Sleeving on wiring		N/A

3.2	Connection to an a.c. mains supply or a d.c. mains supply		P
3.2.1	Means of connection	Appliance inlets	P
3.2.1.1	Connection to an a.c. mains supply	Appliance inlets	P
3.2.1.2	Connection to a d.c. mains supply		N/A
3.2.2	Multiple supply connections		N/A
3.2.3	Permanently connected equipment		N/A
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4	Appliance inlets	IEC approved appliance inlet	P
3.2.5	Power supply cords	For PSU Type –A a certified power cord	P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
3.2.5.1	AC power supply cords	Certified power cords	P
	Type.....	(see append table 1.5.1)	—
	Rated current (A), cross-sectional area (mm^2), AWG.....		—
3.2.5.2	DC power supply cords		N/A
3.2.6	Cord anchorages and strain relief		N/A
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage		P
3.2.8	Cord guards		N/A
	D (mm); test mass (g)		—
	Radius of curvature of cord (mm).....		—
3.2.9	Supply wiring space		N/A

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

3.4	Disconnection from the mains supply		P
3.4.1	General requirement	Appliance coupler is considered the disconnect device.	P
3.4.2	Disconnect devices	Refer to above	P
3.4.3	Permanently connected equipment		N/A
3.4.4	Parts which remain energized		N/A
3.4.5	Switches in flexible cords		N/A
3.4.6	Single-phase equipment and d.c. equipment	Disconnect device disconnects all poles simultaneously	P
3.4.7	Three-phase equipment		N/A

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
3.4.8	Switches as disconnect devices		N/A
3.4.9	Plugs as disconnect devices	Appliance coupler is the regarded disconnected device	N/A
3.4.10	Interconnected equipment		N/A
3.4.11	Multiple power sources		N/A

3.5	Interconnection of equipment		P
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits.....	SELV	P
3.5.3	ELV circuits as interconnection circuits		N/A

4	PHYSICAL REQUIREMENTS		P
4.1	Stability		P
	Angle of 10°		P
	Test: force (N)		N/A

4.2	Mechanical strength		P
4.2.1	General		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		P
	Fall test	Tests conducted inside the computer at the enclosure of certified PSUs	P
	Swing test		N/A
4.2.6	Drop test		N/A
4.2.7	Stress relief test		N/A
4.2.8	Cathode ray tubes		N/A
	Picture tube separately certified.....	(see separate test report or attached certificate)	N/A
4.2.9	High pressure lamps		N/A
4.2.10	Wall or ceiling mounted equipment; force (N)		N/A

4.3	Design and construction		P
4.3.1	Edges and corners		P
4.3.2	Handles and manual controls; force (N).....		N/A
4.3.3	Adjustable controls		N/A
4.3.4	Securing of parts		P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.3.5	Connection of plugs and sockets	Applied in certified PSUs	P
4.3.6	Direct plug-in equipment		N/A
	Dimensions (mm) of mains plug for direct plug-in		N/A
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N).....		N/A
4.3.7	Heating elements in earthed equipment		N/A
4.3.8	Batteries	Only the lithium battery on the CPU board.	P
4.3.9	Oil and grease		N/A
4.3.10	Dust, powders, liquids and gases		N/A
4.3.11	Containers for liquids or gases		N/A
4.3.12	Flammable liquids.....		N/A
	Quantity of liquid (l).....		N/A
	Flash point (°C)		N/A
4.3.13	Radiation; type of radiation		N/A
4.3.13.1	General		N/A
4.3.13.2	Ionizing radiation		N/A
	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/A
	Part, property, retention after test, flammability classification		N/A
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N/A
4.3.13.5	Laser (including LEDs)	(see separate test report of IEC/EN 60825-1 / IEC/EN 60825-2)	N/A
	Laser class		—
4.3.13.6	Other types		N/A

4.4	Protection against hazardous moving parts		P
4.4.1	General	DC-fans are located in protected area.	P
4.4.2	Protection in operator access areas		P
4.4.3	Protection in restricted access locations		N/A
4.4.4	Protection in service access areas		P

4.5	Thermal requirements	P

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.5.1	Maximum temperatures	(see appended table 4.5)	N/A
	Normal load condition per Annex L.....		N/A
4.5.2	Resistance to abnormal heat		N/A

4.6	Openings in enclosures		P
4.6.1	Front and rear side openings	Only ventilation openings on the front-, rear-side of the enclosures: • Rear side: Removable rectangular air filter cover made of metal (area 12,3 x 10,7 cm filled out with 8x8 rectangular 10 mm holes). Air filter is mounted on unit metal fence enclosure (behind of filter area filled out with 6 x 6 rectangular 10 mm holes). • Front upper left side: Air outflow openings. Holes at a length of 9 cm (4 x 30 horizontal holes), holes have a diameter of 1,8 mm. • Front left and right side of the I/O slot cage: Air outflow openings. Holes at a height of 10 cm (4 x 33 vertical holes), holes have a diameter of 1,8 mm. • 8 horisontal airflow opening slots (3x34 mm) cover the openings of the certified AC/DC PSU Type -A. or –B	P
	Dimensions (mm)	Refer to above	—
4.6.2	Bottoms of fire enclosures	No openings in the bottom	P
	Construction of the bottom.....		—
4.6.3	Doors or covers in fire enclosures	By the operator removable enclosure part is the top cover. This part is only seldom (in case of changing the computer configuration) to be opened and sufficient hints are given in the operation manual how to remove and install top cover. Removable rectangular air filter cover (rear side)	P
4.6.4	Openings in transportable equipment		N/A
4.6.5	Adhesives for constructional purposes		N/A
	Conditioning temperature (°C)/time (weeks).....		—

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	Appropriate use of components and suitable construction.	P
	Method 1, selection and application of components wiring and materials		P
	Method 2, application of all of simulated fault condition tests	(see appended table 5.3)	N/A
4.7.2	Conditions for a fire enclosure		P
4.7.2.1	Parts requiring a fire enclosure		P
4.7.2.2	Parts not requiring a fire enclosure		N/A
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures	Metal	P
4.7.3.3	Materials for components and other parts outside fire enclosures		P
4.7.3.4	Materials for components and other parts inside fire enclosures		P
4.7.3.5	Materials for air filter assemblies	(see append table 1.5.1) min. V2	P
4.7.3.6	Materials used in high-voltage components		N/A

5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		P
5.1.1	General		P
5.1.2	Equipment under test (EUT)		P
5.1.3	Test circuit	5a	P
5.1.4	Application of measuring instrument	Annex D.1	P
5.1.5	Test procedure		P
5.1.6	Test measurements		P
	Test voltage (V)	PSU Type –A: 254,5 VAC	—
	Measured touch current (mA)	50 Hz: max. 0,5 mA 60 Hz: max. 0,6 mA	—
	Max. allowed touch current (mA)	3,5 mA r.m.s.	—
	Measured protective conductor current (mA)		—
	Max. allowed protective conductor current (mA)..		—
5.1.7	Equipment with touch current exceeding 3.5 mA		N/A
5.1.8	Touch currents to and from telecommunication networks and cable distribution systems and from telecommunication networks		N/A

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
5.1.8.1	Limitation of the touch current to a telecommunication network and a cable distribution system	No TNV circuit	N/A
	Test voltage (V)		—
	Measured touch current (mA)		—
	Max. allowed touch current (mA)		—
5.1.8.2	Summation of touch currents from telecommunication networks.....		N/A

5.2	Electric strength		P
5.2.1	General	(see appended table 5.2)	P
5.2.2	Test procedure	(see appended table 5.2)	P

5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	(see appended Annex B)	P
5.3.3	Transformers	(see appended Annex C)	N/A
5.3.4	Functional insulation.....	Method c) used	P
5.3.5	Electromechanical components	Not used	N/A
5.3.6	Simulation of faults		P
5.3.7	Unattended equipment		N/A
5.3.8	Compliance criteria for abnormal operating and fault conditions		P
6	CONNECTION TO TELECOMMUNICATION NETWORKS		N/A
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N/A
6.1.1	Protection from hazardous voltages		N/A
6.1.2	Separation of the telecommunication network from earth		N/A
6.1.2.1	Requirements	(see appended table 5.2)	N/A
	Test voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2	Exclusions.....		N/A

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

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.2.2.3	Compliance criteria		N/A

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

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

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

B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		P
B.1	General requirements		P
	Position	Motors used within certified drives	—
	Manufacturer	please refer to the table “ list of critical components “	—
	Type		—
	Rated values		—
B.2	Test conditions		N/A
B.3	Maximum temperatures	(see appended table 5.3)	N/A
B.4	Running overload test	(see appended table 5.3)	N/A
B.5	Locked-rotor overload test		N/A
	Test duration (days)		—
	Electric strength test: test voltage (V)		—
B.6	Running overload test for d.c. motors in secondary circuits		N/A
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
B.7.1	Test procedure	(see appended table 5.3)	N/A
B.7.2	Alternative test procedure; test time (h).....		N/A
B.7.3	Electric strength test	(see appended table 5.2)	N/A
B.8	Test for motors with capacitors	(see appended table 5.3)	N/A
B.9	Test for three-phase motors	(see appended table 5.3)	N/A
B.10	Test for series motors		N/A
	Operating voltage (V)		—

C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		P
	Position	Transformer within certified PSU	—
	Manufacturer	please refer to the table “ list of critical components “	—
	Type		—
	Rated values		—
	Method of protection		—
C.1	Overload test	(see appended table 5.3)	P
C.2	Insulation	(see appended table 5.2)	P
	Protection from displacement of windings.....		N/A

D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS		P
D.1	Measuring instrument		P
D.2	Alternative measuring instrument		N/A

E	ANNEX E, TEMPERATURE RISE OF A WINDING	N/A

F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10)	P

G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N/A
G.1	Summary of the procedure for determining minimum clearances		N/A
G.2	Determination of mains transient voltage (V).....		N/A
G.2.1	AC mains supply		N/A
G.2.2	DC mains supply		N/A
G.3	Determination of telecommunication network transient voltage (V).....		N/A
G.4	Determination of required withstand voltage (V)...		N/A
G.5	Measurement of transient levels (V).....		N/A
G.6	Determination of minimum clearances		N/A

H	ANNEX H, IONIZING RADIATION (see 4.3.13)	N/A

J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N/A
	Metal used		—

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

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

M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N/A
M.1	Introduction		N/A
M.2	Method A		N/A
M.3	Method B		N/A
M.3.1	Ringing signal		N/A
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/A
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N/A
M.3.2.2	Tripping device		N/A
M.3.2.3	Monitoring voltage (V).....		N/A

N	ANNEX N, IMPULSE TEST GENERATORS (see 2.10.3.4, 6.2.2.1, 7.3.2 and clause G.5)		N/A
N.1	ITU-T impulse test generators		N/A
N.2	IEC 60065 impulse test generator		N/A

P	ANNEX P, NORMATIVE REFERENCES	P

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

S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)	N/A

S.1	Test equipment		N/A
S.2	Test procedure		N/A
S.3	Examples of waveforms during impulse testing		N/A

T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N/A
		See separate test report	—

U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N/A
			—

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
CENELEC COMMON MODIFICATIONS [C], SPECIAL NATIONAL CONDITIONS [S] AND A-DEVIATIONS (NATIONAL DEVIATIONS) [A] (EN 60950-1:2001)			P
General	Delete all the "country" notes in the reference document according to the following list: 1.1.5 Note 2 1.5.8 Note 2 1.6.1 Note 1.7.2 Note 4 1.7.12 Note 2 2.6 Note 2.2.3 Note 2.2.4 Note 2.3.2 Note 2, 7, 8 2.3.3 Note 1, 2 2.3.4 Note 2,3 2.7.1 Note 2.10.3.1 Note 4 3.2.1.1 Note 3.2.3 Note 1, 2 3.2.5.1 Note 2 4.3.6 Note 1,2 4.7.2.2 Note 4.7.3.1 Note 2 6.1.2.1 Note 6.1.2.2 Note 6.2.2 Note 6.2.2.1 Note 2 6.2.2.2 Note 7 Note 4 7.1 Note G2.1 Note 1, 2 Annex H Note 2	Deleted	Deleted
2.7.1	Replace the subclause as follows: *Basic requirements* To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment; b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.	Replaced	Replaced
2.7.2	Void.	Replaced	Replaced
2.10.2	Replace in the first line "(see also 1.4.7)" by "(see also 1.4.8)".	Replaced	Replaced
3.2.3	C: Delete Note 1 and in Table 3A, delete the conduit sizes in parentheses.	Deleted	Delated

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
3.2.5.1	Replace "60245 IEC 53" by "H05 RR-F"; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2". In Table 3B, replace the first four lines by the following: Up to and including 6 0,75[1)] Over 6 up to and including 10 (0,75)[2)] 1,0 Over 10 up to and including 16 (1,0)[3)] 1,5 In the Conditions applicable to Table 3B delete the words "in some countries" in condition [1)]. In Note 1, applicable to Table 3B, delete the second sentence.	Replaced and Delated	Replaced and Delated
3.3.4	In table 3D, delete the fourth line: conductor sizes for 10 to 13A, and replace with the following: "Over 10 up to and including 16 1,5 to 2,5 1,5 to 4 Delete the fifth line: conductor sizes for 13 to 16 A.	No wiring terminals	Replaced and Delated
4.3.13.6	Add the following note: NOTE Attention is drawn to 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz. Standards taking into account this recommendation are currently under development.	Noted	Added
Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the operator access area, the dose rate shall not exceed 1 µSv/h (0,1 mR/h) (see note). Account is taken of the background level. Replace the notes as follows: NOTE These values appear in Directive 96/29/Euratom. Delete Note 2.	No ionizing radiation	Replaced
Annex P	Replace the text of this annex by: See annex ZA.	Noted	Replaced

IEC 60950-1 / EN 60950-1			
Clause	Requirement – Test	Result – Remark	Verdict
Annex Q	Replace the title of IEC 61032 by "Protection of persons and equipment by enclosures – Probes for verification". Add the following notes for the standards indicated: IEC 60127 NOTE Harmonized as EN 60127 (Series) (not modified) IEC 60269-2-1 NOTE Harmonized as HD 630.2.1 S4:2000 (modified) IEC 60529 NOTE Harmonized as EN 60529:1991 (not modified) IEC 61032 NOTE Harmonized as EN 61032:1998 (not modified) IEC 61140 NOTE Harmonized as EN 61140:2001 (not modified) ITU-T Recommendation K.31 NOTE in Europe, the suggested document is EN 50083-1.	Noted	Replaced

Note: Before placing the products in the different countries, the manufacturer must ensure that:

1. Operating Instructions, Ratings Labels and Warnings Labels are in an Accepted or Official Language of the country in question.
2. The equipment complies with the National Standards and/or Electrical Codes of the country, province or city or in question.

Annex ZA	C: NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR RELEVANT EUROPEAN PUBLICATIONS This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments). NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.		P
	—	IEC 60050-151	P
	—	IEC 60050-195	P
	EN 60065:1998 + corr. June 1999	IEC 60065 (mod):1998	P
	EN 60073:1996	IEC 60073:1996	P
	HD 566 S1:1990	IEC 60085:1984	P
	HD 214 S2:1980	IEC 60112:1979	P
	HD 611.4.1.S1:1992	IEC 60216-4-1:1990	P
	HD 21 [1)] Series	IEC 60227 (mod) Series	P
	HD 22 [2)] Series	IEC 60245 (mod) Series	P
	EN 60309 Series	IEC 60309 Series	P
	EN 60317-43:1997	IEC 60317-43:1997	P
	EN 60320 Series	IEC 60320 (mod) Series	P
	HD 384.3 S2:1995	IEC 60364-3 (mod):1993	P
	HD 384.4.41 S2:1996	IEC 60364-4-41 (mod):1992 [3)]	P
	EN 132400:1994 [4)] + A2:1998 + A3:1998 + A4:2001	IEC 60384-14:1993	P
	EN 60417-1	IEC 60417-1	P
	HD 625.1 S1:1996 + corr. Nov. 1996	IEC 60664-1 (mod):1992	P
	EN 60695-2-2:1994	IEC 60695-2-2:1991	P
	EN 60695-2-11:2001	IEC 60695-2-11:2000	P
	—	IEC 60695-2-20:1995	P
	—	IEC 60695-10-2:1995	P
	—	IEC 60695-11-3:2000	P
	—	IEC 60695-11-4:2000	P
	EN 60695-11-10:1999	IEC 60695-11-10:1999	P
	EN 60695-11-20:1999	IEC 60695-11-20:1999	P
	EN 60730-1:2000	IEC 60730-1:1999 (mod)	P
	EN 60825-1:1994 + corr. Febr. 1995 + A11:1996 + corr. July 1997	IEC 60825-1:1993	P
	EN 60825-2:2000	IEC 60825-2:2000	P
	—	IEC 60825-9:1999	P
	EN 60851-3:1996	IEC 60851-3:1996	P
	EN 60851-5:1996	IEC 60825-5:1996	P
	EN 60851-6:1996	IEC 60851-6:1996	P
	—	IEC 60885-1:1987	P
	EN 60990:1999	IEC 60990:1999	P
	—	IEC 61058-1:2000	P
	EN 61965:2001	IEC 61965:2000	P
	EN ISO 178:1996	ISO 178:1993	P
	EN ISO 179 Series	ISO 179 Series	P

	EN ISO 180:2000	ISO 180:1993	P
	—	ISO 261:1998	P
	—	ISO 262:1998	P
	EN ISO 527 Series	ISO 527 Series	P
	—	ISO 386:1984	P
	EN ISO 4892 Series	ISO 4892 Series	P
	—	ISO 7000:1989	P
	EN ISO 8256:1996	ISO 8256:1990	P
	—	ISO 9772:1994	P
	EN ISO 9773:1998	ISO 9773:1998	P
	—	ITU-T:1988 Recommendation K.17	P
	—	ITU-T:2000 Recommendation K.21	P
	1) The HD 21 series is related to, but not directly equivalent with the IEC 60227 series 2) The HD 22 series is related to, but not directly equivalent with the IEC 60245 series 3) IEC 60364-4-41:1992 is superseded by IEC 60364-4-41:2001 4) EN 132400, Sectional Specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains (Assessment level D), and its amendments are related to, but not directly equivalent to IEC 60384-14		P

Remark:

Only the applicable normative references/standards were taken into consideration even other standards verdict with P !

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/DC-Power Supply Type: A	BOSER Technology Co.,Ltd.	FSP180-50PLA	Input: 115/220-230 VAC, max.4A/115Vrms/60Hz; max.2A/230Vrms/50Hz Output: 5 / 3,3 / 12 / -12/ 5vsb ; 12 / 16,6 / 10 / / 0,3 / 2 A; each output is short circuit and over voltage protected without over temperature protection	EN/IEC 60950	TÜV; UL; CSA, NEMKO, CB
DC/DC-Power Supply Type: B	Sparkle Power Inc.	FSP150-60DL(24V)	150 Watts 24V DC Input Flex ATX; Internal 12V DC fan; Input Range: 18 - 32V; Input Line Current: 24VDC 14A (RMS) DC Output: 5 / 3,3 / 12 / -12/ 5vsb ; 14 / 10 / 4,2/ / 0,3 / 2 A; Output over voltage, short circuit, and over current protection without over temperature protection	EN/IEC 60950	TÜV; UL; CSA, NEMKO
Hard Disk (HD) IDE-Interface	Hitachi / IBM	Deskstar 7K80	5 / 12 VDC 0,7 / 1,8 A	IEC 60950	TÜV; UL; CSA
Alternate IDE-Interface	Hitachi / IBM	Deskstar 7K250	5 / 12 VDC 0,7 / 1,8 A	IEC 60950	TÜV; UL; CSA
Alternate IDE-Interface	Hitachi / IBM	Deskstar T7K250	5 / 12 V 0,8 / 2,0 A	IEC 60950	TÜV; UL; CSA
Alternate IDE-Interface	Several	Several	5 / 12 VDC Either max. 0,8 / 2 A or max. 28 W	IEC 60950	TÜV; UL; CSA
IDE CD/DVD-ROM	Teac	DV-516G-095	5 / 12 VDC, 26W max.	IEC/UL	TÜV; UL; CSA; NEMKO, CB
IDE CD/DVD Burner	SONY	DRU-810A	5 / 12 VDC; 2 / 1 A; Max.16W; operating tmp. 5 to 35°C;	IEC/UL	TÜV; UL; CSA
IDE CD/DVD Burner	Teac	DW224EB	5 VDC; max. 1,5A	IEC/UL	TÜV; UL; CSA
IDE CD/DVD-ROM	Several	Several	5 / 12 VDC, max.26W	IEC/UL	TÜV; UL; CSA

object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
CPU-Board	KONTRON	ePCI-101	ATX- Motherboard type; Intel® M Processor 1,6 GHz	IEC/UL	Compliance evaluated while testing
Backplane	KONTRON	1075-002-01-007-P7	Slot 4	IEC/UL	Compliance evaluated while testing
Adapter-PCB	ES&S or trademark	ADA-CDROM-IDE40-DIREKT (-A)	Adapter-PCB for Slim Line CD-Rom	IEC/UL	Compliance evaluated while testing
Chassis Fan	Papst	3412N/2V, construction number 6003010904) .	Chassis fan 8-12,6VDC; 208 mA; 2,5 W; locked rotor protection 0,2/0,9 sec.; control input temperature 30°C to 50°C; 35,9 CFM or 61 m^3/h Temp.range operating: -20°C to +65°C non operating: -40°C to +80°C	EN/IEC 60950	UL, CSA, VDE
Alternate Fan	Several	Several	12VDC/max.4 W; Airflow min. 35,1 CFM or 60 m^3/h	IEC/UL	UL, CSA, VDE
Lithium battery	VARTA	CR2032	3 VDC; 180 mAh $I_{rev.max}$ = 5 mA	UL	UL
Alternate lithium Batteries on CPU-Board	Several	Several	3.0 VDC; 0.2 Ah Irev. Max=5mA	UL	UL
PTCs on CPU-Board	Raychem	MiniSMDC075-2	max. 13,2 VDC hold 0,75A 1,5 A trip, max.40A	UL	UL,TÜV,CSA
Air Filter	Heinz Fischer KG	PN/160	--	UL94	--
Inner plastic parts	Several	Several	Min. UL 94-2	Basis material UL94	UL
PCB's	Several	Several	min. UL 94V-1	UL94	UL
[1]) an asterisk indicates a mark which assures the agreed level of surveillance					

1.6.2a	TABLE: electrical data (in normal conditions) Test conducted with 2-A0CC-2001; PSU Type AC and conditions as explained under chapter general description. Additional power (P) = 75W (3 x 25 W) was simulated with special electronic load PCI- Interface boards inside the unit.	P

fuse #	Irated (A)	U (V)	P (W)	I (mA)	Ifuse (mA)	condition/status
50 Hz measurement:						
*	max.2,0	90	179,8	1998	*	See upper mentioned comments
*	max.2,0	100	177	1770	*	See upper mentioned comments
*	max.2,0	115	176,6	1536	*	See upper mentioned comments
*	max.2,0	126,5	165,8	1311	*	See upper mentioned comments
*	max.2,0	230	168,3	732	*	See upper mentioned comments
*	max.2,0	254,4	170,9	672	*	See upper mentioned comments
60 Hz measurement:						
*	max.2,0	90	169,5	1884	*	See upper mentioned comments
*	max.2,0	115	165,8	1422	*	See upper mentioned comments
*	max.2,0	126,5	162,5	1285	*	See upper mentioned comments
*	max.2,0	216	162,6	753	*	See upper mentioned comments
*	max.2,0	240	168,7	703	*	See upper mentioned comments
*	max.2,0	254,4	174,7	687	*	See upper mentioned comments

- = Mains fuse located in certified PSUs

1.6.2b	TABLE: electrical data (in normal conditions) Test conducted with 2-A0CC-2002; PSU Type DC and conditions as explained under chapter general description. Additional power (P) = 75W (3 x 25 W) was simulated with special electronic load PCI- Interface boards inside the unit.	P

fuse #	Irated (A)	U (V)	P (W)	I (mA)	Ifuse (mA)	condition/status
DC measurement:						
*	max.12,0	18	216	12000	*	See upper mentioned comments
*	max.3,0	24	192	8050	*	See upper mentioned comments
*	max.3,0	32	184	5750	*	See upper mentioned comments

* = Mains fuse located in certified PSUs

2.10.3 and 2.10.4	TABLE: clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
The power supplies are already certified						
Note: Only applicable for certified PSUs. No further evaluation has been conducted.						

2.10.5	TABLE: distance through insulation measurements				P
distance through insulation di at/of:	Up (V)	test voltage (V)	required di (mm)	di (mm)	
The power supplies are already certified					
Note: Only applicable for certified PSUs. No further evaluation has been conducted.					

4.5a	TABLE: maximum temperatures						P
	test voltage (V) ..... :	90	230	254,5	VAC	--	—
	t_{amb1} (°C) ..... :	26,2	25,9	25,4	°C	--	—
	t_{amb2} (°C) ..... :	25,9	25,4	24	°C	--	—

maximum temperature T of part/at::	T (°C)					allowed T_{max} (°C)
1) Hot point unit outside (Hot-Spot)	32,5	32,5	32,8	--	--	70
2) Hot point PSU area (PSU enclosure upper corner at area of PSU)	39,2	38,9	38,8	--	--	70
3) Hot point CPU	54,6	54,4	54,2	--	--	80
4) Hot point Chipset	54,6	54,4	54,2	--	--	80
5) ATX Connector	42,8	42,6	42,5	--	--	95
6) Hot point HD (motor area)	35,6	35,5	35,3	--	--	70
				--	--	
				--	--	
				--	--	
				--	--	
				--	--	
				--	--	
				--	--	

General : Test conducted with 2-A0CC-2001; PSU Type AC and conditions as explained under chapter general description. Additional power (P) = 75W (3 x 25 W) was simulated with special electronic load PCI-Interface boards inside the unit.

Unit allowed to be run at an ambient temperature of a max. 50°C. Temperatures at components and surrounding measured with thermocouples. Temperature resistance taken under consideration.

2 fans cool the unit: 1 standard chassis fan within computer frame and 1 fan within the certified PSU. These fans controlled the inside temperature. The CPU cooler gets the fresh air from chassis fan. The test specimen was checked for the surroundings conditions sufficiently.

System must provide minimum 1,7 m/s airflow for 50°C environment if the heat sink without fan is used.

temperature T of winding:	R_1 (Ω)	R_2 (Ω)	T (°C)	allowed T_{max} (°C)	insulation class
N/A					

4.5b	TABLE: maximum temperatures						P
	test voltage (V) ..... :	18	24	32	VDC	--	—
	t_{amb1} (°C) ..... :	26,2	25,9	25,4	°C	--	—
	t_{amb2} (°C) ..... :	25,9	25,5	24	°C	--	—

maximum temperature T of part/at::	T (°C)					allowed T_{max} (°C)
1) Hot point unit outside (Hot-Spot)	32,8	32,9	32,8	--	--	70
2) Hot point PSU area (PSU enclosure upper corner at area of PSU)	43	42,4	42	--	--	70
3) Hot point CPU	59,9	60,5	60,2	--	--	80
4) Hot point Chipset	59,9	60,5	60,2	--	--	80
5) ATX Connector	41,9	41,9	41,9	--	--	95
6) Hot point HD (motor area)	37	36,9	37	--	--	70
				--	--	
				--	--	
				--	--	
				--	--	
				--	--	
				--	--	
				--	--	

General : Test conducted with 2-A0CC-2002; PSU Type DC and conditions as explained under chapter general description. Additional power (P) = 75W (3 x 25 W) was simulated with special electronic load PCI-Interface boards inside the unit.

Unit allowed to be run at an ambient temperature of a max. 50°C. Temperatures at components and surrounding measured with thermocouples. Temperature resistance taken under consideration.

2 fans cool the unit: 1 standard chassis fan within computer frame and 1 fan within the certified PSU. These fans controlled the inside temperature. The CPU cooler gets the fresh air from chassis fan. The test specimen was checked for the surroundings conditions sufficiently.

System must provide minimum 1,7m/s airflow for 50°C environment if the heat sink without fan is used.

temperature T of winding:	R_1 (Ω)	R_2 (Ω)	T (°C)	allowed T_{max} (°C)	insulation class
N/A					

4.5.2	TABLE: ball pressure test of thermoplastic parts	N/A
	allowed impression diameter (mm) ..... : ≤ 2 mm	—

part	test temperature (°C)	impression diameter (mm)

4.7	TABLE: resistance to fire	P

part	manufacturer of material	type of material	thickness (mm)	flammability class
All plastic materials fulfill fire enclosure requirements ! For more information please refer to table list of critical components				

5.2	TABLE: electric strength tests, impulse tests and voltage surge tests	N/A

test voltage applied between:	test voltage (V) a.c. / d.c.	breakdown Yes / No
Electrical strength test on the PSU AC Input (60 s) still in a well-heated condition immediately following the heating test.	1500 V r.m.s.	No
supplementary information: The PSU are already EN/IEC/UL 60950-1 certified		

5.3	TABLE: fault condition tests		P
	ambient temperature (°C) ..... :	23°C	—
	model/type of power supply ..... :	Certified PSU	—
	manufacturer of power supply ..... :	Please refer to list of critical components.	—
	rated markings of power supply ..... :	Please refer to list of critical components.	—

component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
Type –A PSU output (12VDC)	shorted	253	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –A PSU output (5VDC)	shorted	253	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –A PSU output (3,3VDC)	shorted	253	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –A PSU output (- 12V)	shorted	253	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –A PSU output (-5VDC)	shorted	253	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –A PSU Computer Unit – all openings closed!	See result	253	steady temp. behaviour	--	--	Fan openings on rear and front side closed. All Fans of the unit working steadily. The computer energy menagement shot down the computer at < 100°C CPU Die temperature. No critical temp. behaviour !
Type –A PSU Chassis Fan is blocked	See result	253	steady temp. behaviour	--	--	The computer energy menagement shot down the computer at < 100°C CPU Die temperature. No critical temp. behaviour !
Type –B PSU output (12VDC)	shorted	32	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –B PSU output (5VDC)	shorted	32	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –B PSU output (3,3VDC)	shorted	32	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –B PSU output (- 12V)	shorted	32	< 1 sec.	--	--	Output short protected. PSU is already certified!
Type –B PSU output (-5VDC)	shorted	32	< 1 sec.	--	--	Output short protected. PSU is already certified!

component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
Type –B PSU Computer Unit – all openings closed!	See result	24	steady temp. behaviour	--	--	Fan openings on rear and front side closed. All Fans of the unit working steadily. The computer energy menagement shot down the computer at < 100°C CPU Dietemperature. No critical temp. behaviour !
Type –B PSU Chassis Fan is blocked	See result	24	steady temp. behaviour	--	--	The computer energy menagement shot down the computer at < 100°C CPU Die temperature. No critical temp. behaviour !
SFC-Tests on CPU Board ePCI-101:						
CN9; CN10 Interface USB 0 - 1 Pin1 (V_USB0-1) to Pin4 (GND)	shorted	253	steady temp. behaviour	U83	0,9 A	+5Vcc output short protected! U83 shuts +5V output down. SELV Circuit V_USB / measured max. 266mA. All other terminals are I/0-Signals. No critical test behaviour.
CN23 Interface USB 2 – 3 Pin1 and Pin2 (V_USBx) to Pin7 or Pin8 (GND)	shorted	253	steady temp. behaviour	U84	0,9 A	+5Vcc output short protected! U84 shuts +5V output down. SELV Circuit V_USB / measured max. 265mA. All other terminals are I/0-Signals. No critical test behaviour.
CN24 Interface USB 4 – 5 Pin1 and Pin2 (V_USBx) to Pin7 or Pin8 (GND)	shorted	253	steady temp. behaviour	U85	0,9 A	+5Vcc output short protected! U85 shuts +5V output down. SELV Circuit V_USB / measured max. 266mA. All other terminals are I/0-Signals. No critical test behaviour.
Interface COM 1 all outputs	shorted	253	steady temp. behaviour	--	--	SELV Circuit. Only signal inputs and outputs. No critical test behaviour.
Interface COM 2 all outputs	shorted	253	steady temp. behaviour	--	--	SELV Circuit. Only signal inputs and outputs. measured max. 33mA. No critical test behaviour.
LPT1 Interface all outputs	shorted	253	steady temp. behaviour	--	--	SELV Circuit. Only signal inputs and outputs. measured max. 33mA. No critical test behaviour.
Interface VGA +5VDC output Pin9 to GND	shorted	253	steady temp. behaviour	F1	1,5	SELV Circuit V_5V0 / measured max. 252mA. All other terminals are I/0-Signals. No critical test behaviour.
CN15 Interface Keyboard/ Mouse output Pin 5 VCC1 to Pin2 (GND)	shorted	253	steady temp. behaviour	F2	1,5	SELV Circuit VCC / measured max. 282mA. All other terminals are I/0-Signals. No critical test behaviour.

component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
Lithium battery J5	Protection Diode D45 Short Ubat=0V	253	steady temp. behaviour	--	--	Ireverse = 3,0mA (allowed max. 5 mA) Lithium battery protected by: R481 (1kΩ); and one diode D45.
Q49 Pin7 to Pin2 (GND)	shorted	253	steady temp. behaviour	U67	--	No critical test behaviour.
Q47 Pin7 to Pin2 (GND)	shorted	253	steady temp. behaviour	U67	--	No critical test behaviour.
Q50 Pin2 and Pin7	shorted	253	steady temp. behaviour	U67	--	VOUT V_2V5 shot down! No critical test behaviour.
supplementary information: no critical behaviors!						

A.6.5	TABLE: flammability test for classifying materials V-0, V-1 or V-2	N/A

sample No. / ref.	afterflame time (s) t_1 or t_2	afterflame + afterglow (s) after 2nd flame application $t_2 + t_3$
1/A		
2/A		
3/A		
4/A		
5/A		
6/B		
7/B		
8/B		
9/B		
10/B		
supplementary information:		
Total afterflame time (s) for any condition set $t_1 + t_2$ for five (5) specimens:		
Conditioning "A" designates 7 days at 70 °C ± 1 °C followed by 4 h minimum in calcium chloride desiccator.		
Conditioning "B" designates 48 h at 23 °C ± 2 °C and relative humidity between 45 % and 55 %.		

A.6.6	TABLE: flammability re-test for classifying materials V-0, V-1 or V-2	N/A

sample No.	afterflame time (s) t_1 or t_2	afterflame + afterglow (s) after 2nd flame application $t_2 + t_3$
11		
12		
13		
14		
15		
supplementary information:		
Total afterflame time (s) for any condition set $t_1 + t_2$ for five (5) specimens:		

A.7.4, A.7.5, A.7.6 and A.7.7	TABLE: flammability test for classifying foam materials HF-1, HF-2 or HBF	N/A

sample No. / ref.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment (for A.7.7 burning rate mm/min)
1/A				
2/A				
3/A				
4/A				
5/A				
6/B				
7/B				
8/B				
9/B				
10/B				

supplementary information:

Conditioning "A" designates 7 days at 70 °C ± 1 °C followed by 4 h minimum in calcium chloride desiccator.

Conditioning "B" designates 48 h at 23 °C ± 2 °C and relative humidity between 45 % and 55 %.

A.7.8	TABLE: flammability re-test for classifying foam materials HF-1 or HF-2	N/A

sample No.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment
11				
12				
13				
14				
15				

supplementary information:

A.7.9	TABLE: flammability re-test for classifying foam materials HBF	N/A

sample No.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment (for A.7.7 burning rate mm/min)
11				
12				
13				

sample No.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment (for A.7.7 burning rate mm/min)
14				
15				
supplementary information:				

A.8.5	TABLE: flammability test for classifying materials HB	N/A

sample No.	flaming/glowing rate mm/min	flaming/glowing distance from reference mark (mm)
1		
2		
3		
supplementary information:		

A.8.6	TABLE: flammability re-test for classifying materials HB	N/A

sample No.	flaming/glowing rate mm/min	flaming/glowing distance from reference mark (mm)
4		
5		
6		
supplementary information:		

A.9.6	TABLE: flammability test for classifying materials 5V				N/A

sample No./ref.	test bars		test plaques		
	flaming + glowing time (s)	burning distance (mm)	position	flaming + glowing time (s)	burning distance (mm)
1/A			A		
2/A			B		
3/A			C		
4/A			D		
5/A			—	—	—
6/B			A		
7/B			B		
8/B			C		
9/B			D		

sample No./ref.	test bars		test plaques		
	flaming + glowing time (s)	burning distance (mm)	position	flaming + glowing time (s)	burning distance (mm)
10/B			—	—	—
supplementary information:					
Conditioning "A" designates 7 days at 70 °C ± 1 °C followed by 4 h minimum in calcium chloride desiccator.					
Conditioning "B" designates 48 h at 23 °C ± 2 °C and relative humidity between 45 % and 55 %.					

A.9.7	TABLE: flammability re-test for classifying materials 5V	N/A

sample No.	test bars		test plaques		
	flaming + glowing time (s)	burning distance (mm)	position	flaming + glowing time (s)	burning distance (mm)
11			A		
12			B		
13			C		
14			D		
15			—	—	—
supplementary information:					