| Ref. Certif. No. |
| --- |
| US-TUVR-9174 |

**IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME**

**SYSTEME CEI D' ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC**

# CB TEST CERTIFICATE

# CERTIFICAT D'ESSAI OC

| | |
| --- | --- |
| Product<br>Produit | Component Power Supply<br>for Information Technology Equipment |
| Name and address of the applicant<br>Nom et adresse du demandeur | GE Power Electronics, Inc.<br>601 Shiloh Rd.<br>Plano, TX 75074 US |
| Name and address of the manufacturer<br>Nom et adresse du fabricant | same as applicant |
| Name and address of the factory<br>Nom et adresse de l'usine<br>Note: *When more than one factory, please report on page 2*<br>Note: *Lorsque il y plus d'une usine, veuillez utiliser la 2ème page* | Additional Information, see page 2 |
| Ratings and principal characteristics<br>Valeurs nominales et caractéristiques principales | Additional Information, see page 2 |
| Trademark (if any)<br>Marque de fabrique (si elle existe) | GE |
| Model / Type Ref.<br>Ref. De Type | 1) CP1400xxxxx, 2) CP1800xxxxx, 3) CP2000xxxxx,<br>4) CP2100xxxxx, 5) CP2725xxxxx<br>(x = 0-9, A-Z, blank; not safety-relevant) |
| Additional information (if necessary, may also be reported on page 2)<br>Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2ème page) | Complies with requirements as well as group and national differences where applicable for CA, DE, US as well as EU Group Differences, EU Special National Conditions. Replaces Certificate US-TUVR-7718. |
| A sample of the product was tested and found to be in conformity with IEC<br>Un échantillon de ce produit a été essayé et a été considéré conforme à la CEI | IEC 60950-1+Amd1+Amd2 2nd Edition (2005) |
| As shown in the Test Report Ref. No. which forms part of this Certificate<br>Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat | 30983583.010 |

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme **National de Certification**

TÜVRheinland®
Precisely Right.

Date: September 24, 2015 Page 1 of 2 Signature: Martin Glagla

## Additional Information:

### Name and address of the factories:

Lineage Power China Co. Ltd.
No. 1353 Chenqiao Rd,
Shanghai Fengpu Industrial Park
201401 SHANGHAI
CHINA

Lineage Power Matamoros, S.A. de C.V.
Poniente 2 No. 3 entre Norte 7 Limite del Fraccionamiento Ciudad Industrial (CIMA)
87499 MATAMOROS, TAMAULIPAS
MEXICO

### Ratings and principal characteristics:

1) AC 100-240V, 50-60Hz; 19A
2) AC 100-120V or 200-240V, 50-60Hz; 15-12A or 10A
3) AC 100-120V or 200-240V, 50-60Hz; 15-12A or 11A
4) AC 200-240V, 50-60Hz; 11.5A
5) AC 100-120V or 200-240V, 50-60Hz; 15-12A or 15.6A

Class I

Output Ratings DC:

1) 44-58V, 1400W; 5V, 3.75W
2) 44-58V, 1200W; 5V, 3.75W or 44-58V, 1800W; 5V, 3.75W
3) 44-58V, 1200W; 5V, 3.75W or 44-58V, 2000W; 5V, 3.75W
4) 44-58V, 2100W; 5V, 3.75W
5) 44-58V, 1200W; 5V, 3.75W or 44-58V, 2725W; 5V, 3.75W

This CB Test Certificate is issued by the National Certification body TUV Rheinland of North America, Inc.
*Ce Certificat d'essai OC est établi par l'Organisme National de Certification TUV Rheinland of North America, Inc.*

**Test Report issued under the responsibility of:**

TÜVRheinland®

# TEST REPORT

## IEC 60950-1

## Information technology equipment – Safety – Part 1: General requirements

| | |
|---|---|
| **Report Number. .....:** | 30983583.010 |
| **Date of issue .....:** | September 10, 2015 |
| **Total number of pages.....:** | 68 |
| **Applicant's name.....:** | **GE Power Electronics, Inc.** |
| **Address .....:** | 601 Shiloh Road, Plano, Texas, 75074, USA |
| **Test specification:** | |
| **Standard .....:** | IEC 60950-1:2005 (Second Edition) + A1:2009 + A2:2013 |
| **Test procedure .....:** | CB Scheme |
| **Non-standard test method.....:** | N/A |
| **Test Report Form No.....:** | IEC60950_1F |
| **Test Report Form(s) Originator.....:** | SGS Fimko Ltd |
| **Master TRF .....:** | Dated 2014-02 |



If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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

**General disclaimer:**

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.
The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

| | |
|---|---|
| **Test item description .....:** | Component Power Supply for Information Technology Equipment |
| **Trade Mark .....:** | |
| **Manufacturer.....:** | **GE Power Electronics, Inc.** |
| **Model/Type reference .....:** | CP1400xxxxx, CP1800xxxxx, CP2000xxxxx, CP2100xxxxx, CP2725xxxxx (x = 0-9, a-Z or Blank, not related to safety) |
| **Ratings .....:** | Refer to Page 8 |

| | | | |
|---|---|---|---|
| **Testing procedure and testing location:** | | | |
| ☒ | **CB Testing Laboratory:** | TUV Rheinland of North America Inc. | |
| **Testing location/ address.....:** | | 12 Commerce Road, Newtown, CT 06470, USA | |
| ☐ | **Associated CB Testing Laboratory:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name + signature).....:** | | Allen Kemevor |  |
| **Approved by (name + signature).....:** | | James Howell |  |
| | | | |
| ☐ | **Testing procedure: TMP/CTF Stage 1:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name + signature).....:** | | | |
| **Approved by (name + signature).....:** | | | |
| | | | |
| ☐ | **Testing procedure: WMT/CTF Stage 2:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name + signature).....:** | | | |
| **Witnessed by (name + signature).....:** | | | |
| **Approved by (name + signature).....:** | | | |
| | | | |
| ☐ | **Testing procedure: SMT/CTF Stage 3 or 4:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name + signature).....:** | | | |
| **Witnessed by (name + signature).....:** | | | |
| **Approved by (name + signature).....:** | | | |
| **Supervised by (name + signature).....:** | | | |

| List of Attachments (including a total number of pages in each attachment): | | | | |
|---|---|---|---|---|
| Attachment 1 | – | National Differences | 27 | Pages |
| Attachment 2 | – | Photographs | 2 | Pages |
| Attachment 3 | – | Schematics | 10 | Pages |
| Attachment 4 | – | Transformer Details | 3 | Pages |

**Summary of testing:**

| **Tests performed (name of test and test clause)** | **Testing location:** |
|---|---|
| **for 30983583.006:**<br>Input current (1.6.2)<br>Capacitance Discharge (2.1.1.7)<br>Energy Hazard Measurement (2.1.1.8)<br>SELV circuits (2.2.2, 2.2.3, 2.2.4)<br>Bonding continuity test (2.6.3.4)<br>Humidity conditioning (2.9.2)<br>Clearances, creepage distances and distances through insulation (2.10)<br>Thermal requirements (4.5)<br>Touch current (5.1.6)<br>Electrical strength (5.2)<br>Abnormal operating and fault condition (5.3)<br><br>**Tests performed (name of test and test clause) for Report 30983583.008**<br>Humidity conditioning (2.9.2)<br>**No tests were performed for Report 30983583.010.** | TUV Rheinland of North America, Inc.<br>12 Commerce Road, Newtown, CT 06470, USA |

**Summary of compliance with National Differences**

**List of countries addressed:**

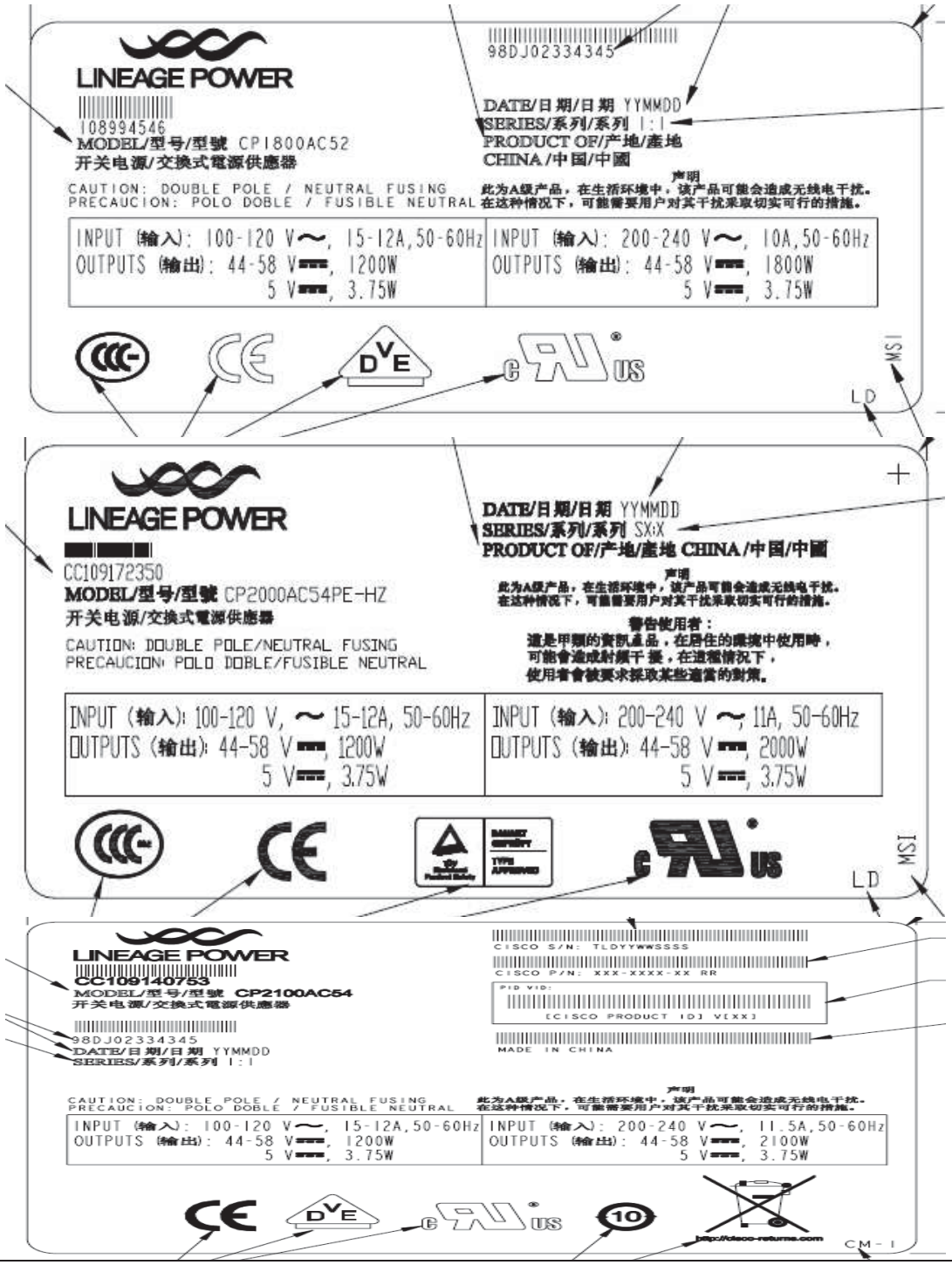
EU Group Differences, EU Special National Conditions, CA, DE, US.

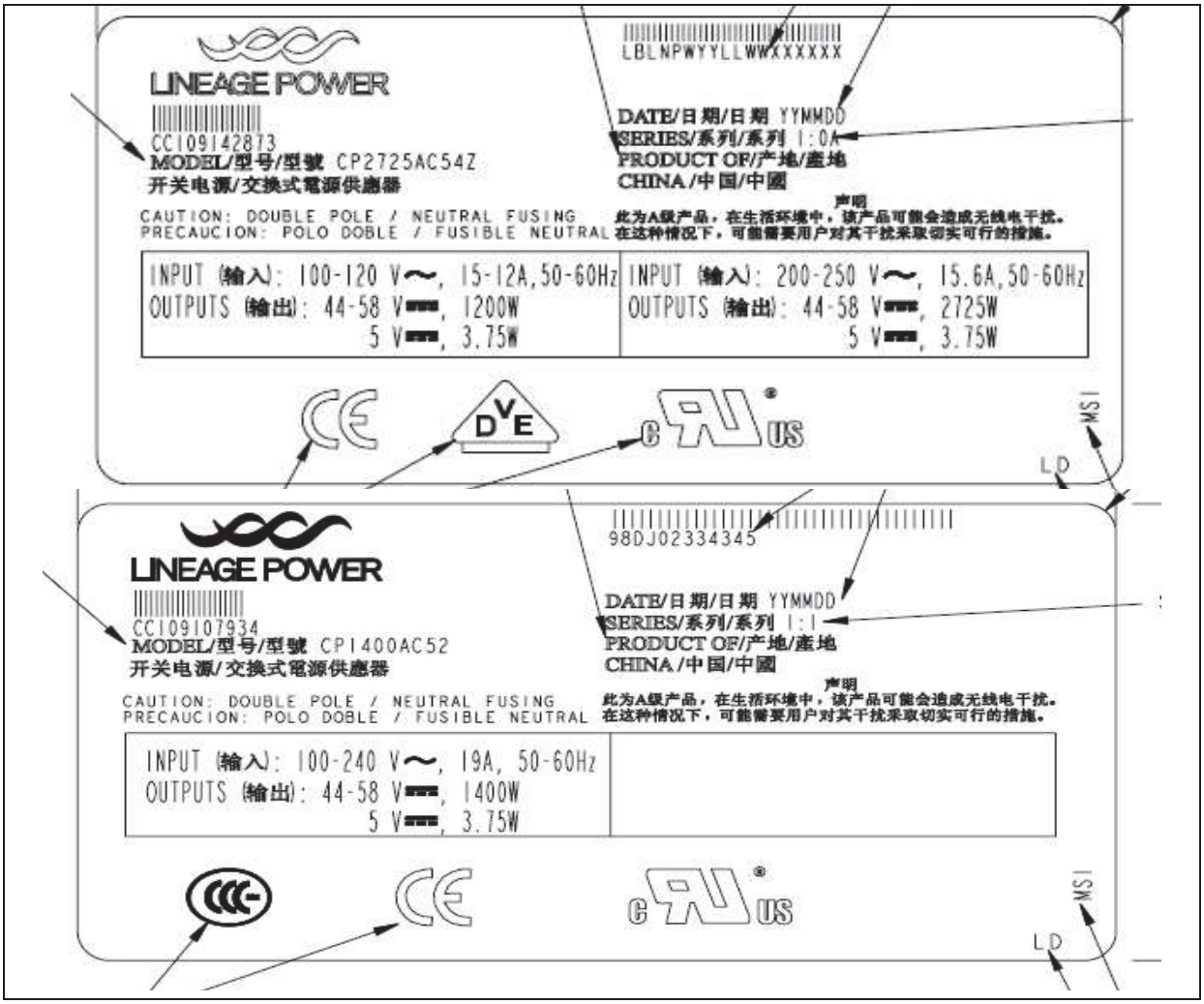
Explanation of used codes: CA=Canada, DE=Germany, US=USA.

☒ **The product fulfils the requirements of** IEC 60950-1:2005 (2nd Edition) + A1:2009 + A2:2013 and EN 60950-1: 2006 +A11: 2009 +A1: 2010 +A12: 2011+ A2: 2013

**Copy of marking plate:**

The artworks below may be only drafts. Label artworks for models not shown are similar to the labels below and may differ only in the model designation and electrical ratings. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.




LINEAGE POWER
CC109142873
MODEL/型号/型號 CP2725AC54Z
开关电源/交换式電源供應器
LBLNPWYYLLWWXXXXXX
DATE/日期/日期 YYMMDD
SERIES/系列/系列 1:0A
PRODUCT OF/产地/產地
CHINA/中国/中國
CAUTION: DOUBLE POLE / NEUTRAL FUSING
PRECAUCION: POLO DOBLE / FUSIBLE NEUTRAL
声明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其干扰采取切实可行的措施。
INPUT (輸入): 100-120 V~, 15-12A,50-60Hz
OUTPUTS (输出): 44-58 V⎓, 1200W
5 V⎓, 3.75W
INPUT (輸入): 200-250 V~, 15.6A,50-60Hz
OUTPUTS (输出): 44-58 V⎓, 2725W
5 V⎓, 3.75W
LD
MSI
LINEAGE POWER
CC109107934
MODEL/型号/型號 CP1400AC52
开关电源/交换式電源供應器
98DJ02334345
DATE/日期/日期 YYMMDD
SERIES/系列/系列 1:1
PRODUCT OF/产地/產地
CHINA/中国/中國
CAUTION: DOUBLE POLE / NEUTRAL FUSING
PRECAUCION: POLO DOBLE / FUSIBLE NEUTRAL
声明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其干扰采取切实可行的措施。
INPUT (輸入): 100-240 V~, 19A, 50-60Hz
OUTPUTS (输出): 44-58 V⎓, 1400W
5 V⎓, 3.75W
LD
MSI

| | |
|---|---|
| **Test item particulars** ..... : | |
| **Equipment mobility** ..... : | [] movable [] hand-held [] transportable<br>[] stationary [X] for building-in [] direct plug-in |
| **Connection to the mains** ..... : | [] pluggable equipment [] type A [] type B<br>[] permanent connection<br>[] detachable power supply cord<br>[] non-detachable power supply cord<br>[X] not directly connected to the mains |
| **Operating condition** ..... : | [X] continuous<br>[] rated operating / resting time: |
| **Access location** ..... : | [] operator accessible<br>[] restricted access location<br>[X] to be determined in the end use application |
| **Over voltage category (OVC)** ..... : | [] OVC I [X] OVC II [] OVC III [] OVC IV |
| **Mains supply tolerance (%) or absolute mains supply values** ..... : | +/-10% |
| **Tested for IT power systems** ..... : | [X] Yes [] No |
| **IT testing, phase-phase voltage (V)** ..... : | 230V~ |
| **Class of equipment** ..... : | [X] Class I [] Class II [] Class III<br>[] Not classified |
| **Considered current rating of protective device as part of the building installation (A)** ..... : | 60A max |
| **Pollution degree (PD)** ..... : | [] PD 1 [X] PD 2 [] PD 3 |
| **IP protection class** ..... : | IPX0 |
| **Altitude during operation (m)** ..... : | 3000 m |
| **Altitude of test laboratory (m)** ..... : | 121 m |
| **Mass of equipment (kg)** ..... : | <2Kg |
| **Possible test case verdicts:** | |
| **- test case does not apply to the test object**..... : | N/A |
| **- test object does meet the requirement**..... : | P (Pass) |
| **- test object does not meet the requirement**..... : | F (Fail) |
| **Testing** ..... : | |
| **Date of receipt of test item** ..... : | 1/23/2012 for 30983583.006<br>4/8/2013 for 30983583.008 |
| **Date(s) of performance of tests**..... : | 2/1/2012 to 2/10/2012 for 30983583.006<br>4/8/2013 to 4/15/2013 for 30983583.008<br>No tests for 30983583.010 |
| | |
| **General remarks:** | |
| "(See Enclosure #)" refers to additional information appended to the report.<br>"(See appended table)" refers to a table appended to the report.<br><br>**Throughout this report a point is used as the decimal separator.** | |

**Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:**

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :

☒ **Yes**

☐ **Not applicable**

**When differences exist; they shall be identified in the General product information section.**

**Name and address of factory (ies).....:**

1. Lineage Power China Co, Ltd.
   No. 1353 Chenqiao Road,
   Shanghai Fengpu Industrial Park,
   Shanghai 201401, China

2. Lineage Power Matamoros, S.A. de C.V. Poniente 2
   No. 3 entre Norte 7 Limite del Fraccionamiento Ciudad Industrial (CIMA) .
   Matamoros, Tamaulipas 87499, Mexico

**General product information:**

The subject power supplies are custom AC-DC switch-mode power supplies. Each model consists of populated, printed circuit boards, wiring and cooling fans all housed in a sheet metal enclosure. The printed circuit boards are rated V-0. The basic insulation is provided between primary and earth, and reinforced insulation is provided between primary and unearthed SELV outputs. The power supplies are housed in a metal enclosure with 2 integral fans for forced air cooling. They are provided with a pin connector that mates with a receptive connector in the end-use equipment. AC power is delivered to the power supplies through the end-use equipment.

Models CP1800, CP2000, CP1400 and CP2100 are similar to each other, except for differences in the logic (SELV) circuit controlling output current limits. Tests performed on any of the above models are deemed to represent the other models too.

Model CP2725 is similar to the models above, except transformer T301 has a larger core and the PWB transformer mounting holes are different to fit the pin layout of the larger transformer.

The factories above produce identical units for all the models.

**Report History:**

30983583.006 – Original report

30983583.008 – Report reissued on applicant's request due to the changed humidity testing for CP1800AC52

**30983583.010 – Upgrade the standard to A2**

**Note:** Report extensions not shown above were used for internal activity not related to the CB Scheme.

**Ratings:**

| Model | | Input | | | | Output (dc) | |
|---|---|---|---|---|---|---|---|
| | | | Voltage (V) | Current (A) | Freq. (Hz) | Voltage (V) | Power max (W) |
| 1) | CP1400xxxxx | | 100-240 | 19 | 50-60 | 44-58** | 1400 |
| | | | | | | 5 | 3.75 |
| 2) | CP1800xxxxx | a) | 100-120 | 15-12 | 50-60 | 44-58** | 1200 |
| | | | | | | 5 | 3.75 |
| | | b) | 200-240 | 10 | 50-60 | 44-58** | 1800 |
| | | | | | | 5 | 3.75 |
| 3) | CP2000xxxxx | a) | 100-120 | 15-12 | 50-60 | 44-58** | 1200 |
| | | | | | | 5 | 3.75 |
| | | b) | 200-240 | 11 | 50-60 | 44-58** | 2000 |
| | | | | | | 5 | 3.75 |
| 4) | CP2100xxxxx | | 200-240 | 11.5 | 50-60 | 44-58** | 2100 |
| | | | | | | 5 | 3.75 |
| 5) | CP2725xxxxx | a) | 100-120 | 15-12 | 50-60 | 44-58** | 1200 |
| | | | | | | 5 | 3.75 |
| | | b) | 200-277 | 15.6 | 50-60 | 44-58** | 2725 |
| | | | | | | 5 | 3.75 |

*Note: x = 0-9, a-Z or Blank denoting non-safety critical customer options.
** Note: The product label rating may be high line only, low line only, or both.
For Models CP2000 and CP2725, refer to item 1 in Conditions of Acceptability for the 70°C ambient with derating.

**Conditions of Acceptability:**

1. The models described in this report are for use as components in Information Technology Equipment and at ambient temperatures as follows:
   Model CP1800 @ 1800W maximum @ 55°C.
   Model CP2000 @ 2000W maximum @ 55°C.
   Model CP2000 @ 1408W maximum @ 70°C (with a linearly derating of 2%/°C).
   Model CP1400 @ 1400W maximum @ 50°C.
   Model CP2100 @ 2100W maximum @ 45°C.
   Model CP2725 @ 2725W @ 55°C, @ 1907W maximum @ 70°C (with a linearly derating of 2%/°C above 55°C).
2. The subject product is not intended to be field serviced or repaired;
3. Reinforced insulation, based upon 250Vac mains voltage and its maximum working voltage, is provided between the input and SELV output circuitry;
4. User instruction in the language of the country of use is to be considered at the end product application.
5. The 44-58Vdc output circuit is SELV which exceeds 240VA. The 5V output circuit is SELV and does not exceed 240VA. Consideration should be taken at the end product to restrict the hazardous energy of the 44-58Vdc output from operator access.

6. Evaluated per the requirements of 60A branch circuit maximum;
7. A suitable Electrical and Fire enclosure shall be provided by the end product.
8. The equipment has been evaluated for use in a Pollution Degree 2 environment;
9. The equipment has been evaluated for use in an IT Power System with the phase-to-phase voltage not exceeding 230Vac;
10. The subject product is provided with a varistor and spark gap connected in series between line/neutral and earth. The combination of the two in series meets the electric strength requirement of BASIC INSULATION between primary and earth. A protective fuse is provided to guard against short circuit. Clearances and creepage distances between the varistor connection point and the earth complies with the requirements for BASIC INSULATION.
11. Except Model CP2725, three protective bonding terminals are provided. The minimum calculated protective bonding path cross section is 2.4mm$_2$ (required 1.5mm$_2$). This complies with the requirements in sub-clause 2.6.3.4 to waive limited short circuit testing. (US and CA National Deviation)
12. For Model CP2725, three protective bonding terminals are provided with total stud diameter >> 3mm. The minimum calculated protective bonding path cross section is 3.1mm$_2$ (required 1.5mm$^2$). This complies with the requirements in sub-clause 2.6.3.4 to waive limited short circuit testing. (US and CA National Deviation).
13. Consideration should be given at the end product approval to evaluate the applicability of hot-swap testing and to provide a mating input connector so that the ground pin is connected before the line pins.
14. The subject product has been evaluated for installation and operation up to an altitude of 3000m.
15. The humidity test meets 40 ºC, 120hrs, 93% for CP1800xxxxx.

**Abbreviations used in the report:**

| | | | |
|---|---|---|---|
| - normal conditions | **N.C**. | - single fault conditions | **S.F.C** |
| - functional insulation | **OP** | - basic insulation | **BI** |
| - double insulation | **DI** | - supplementary insulation | **SI** |
| - between parts of opposite polarity | **BOP** | - reinforced insulation | **RI** |

**Indicate used abbreviations (if any)**

| IEC 60950-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **1** | **GENERAL** | | P |
| **1.5** | **Components** | | P |
| 1.5.1 | General | | P |
| | Comply with IEC 60950-1 or relevant component standard | (see appended tables 1.5.1) | P |
| 1.5.2 | Evaluation and testing of components | Components are used within their voltage, current, temperature, and other applicable rating. | P |
| 1.5.3 | Thermal controls | No thermal controls | N/A |
| 1.5.4 | Transformers | All safety-isolating transformers are suitable for the intended application and comply with the requirements. | P |
| 1.5.5 | Interconnecting cables | No interconnecting cables. End product consideration | N/A |
| 1.5.6 | Capacitors bridging insulation | Line-to-line capacitors are type X1 or X2. Primary to ground capacitors are type Y1 or Y2. Primary to secondary capacitors are subclass Y1. All approved to IEC60384-14 2nd Edition | P |
| 1.5.7 | Resistors bridging insulation | No resistors bridging insulation | N/A |
| 1.5.7.1 | Resistors bridging functional, basic or supplementary insulation | Resistors bridging functional insulation after fuse. | N/A |
| 1.5.7.2 | Resistors bridging double or reinforced insulation between a.c. mains and other circuits | No resistors bridging double or reinforced insulation between a.c. mains and other circuits | N/A |
| 1.5.7.3 | Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable | No resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable | N/A |
| 1.5.8 | Components in equipment for IT power systems | “Y2” capacitors approved to IEC60384-14 2nd Ed. | P |
| 1.5.9 | Surge suppressors | | P |
| 1.5.9.1 | General | VDRs comply with relevant standards | P |
| 1.5.9.2 | Protection of VDRs | Fuse protects VDRs | P |
| 1.5.9.3 | Bridging of functional insulation by a VDR | VDRs connected line-neutral is UL recognized/VDE licensed | P |
| 1.5.9.4 | Bridging of basic insulation by a VDR | UL Recognized/VDE Licensed component used | P |
| 1.5.9.5 | Bridging of supplementary, double or reinforced insulation by a VDR | None | N/A |

| IEC 60950-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **1.6** | **Power interface** | | P |
| 1.6.1 | AC power distribution systems | TN, TT and IT power systems | P |
| 1.6.2 | Input current | (see appended table 1.6.2) | P |
| 1.6.3 | Voltage limit of hand-held equipment | Unit is not hand held | N/A |
| 1.6.4 | Neutral conductor | The neutral conductor is isolated from earth and chassis with basic insulation. | P |
| **1.7** | **Marking and instructions** | | P |
| 1.7.1 | Power rating and identification markings | Marking provided on label | P |
| 1.7.1.1 | Power rating marking | Marking provided on label | P |
| | Multiple mains supply connections.....: | - | N/A |
| | Rated voltage(s) or voltage range(s) (V) ..... : | Refer to page 8 of report | P |
| | Symbol for nature of supply, for d.c. only..... : | AC input unit | N/A |
| | Rated frequency or rated frequency range (Hz) .... : | 50-60Hz | P |
| | Rated current (mA or A) ..... : | Refer to page 8 of report | P |
| 1.7.1.2 | Identification markings | Marking provided on label | P |
| | Manufacturer's name or trade-mark or identification mark ..... : | Lineage Power Corporation or GE or GE Energy | P |
| | Model identification or type reference ..... : | Makring provided on label | P |
| | Symbol for Class II equipment only ..... : | Class I | N/A |
| | Other markings and symbols ..... : | cURus, TUV, CE | N/A |
| 1.7.1.3 | Use of graphical symbols | - | N/A |
| 1.7.2 | Safety instructions and marking | Provided with each unit | P |
| 1.7.2.1 | General | Equipment for building-in | N/A |
| 1.7.2.2 | Disconnect devices | End product consideration | N/A |
| 1.7.2.3 | Overcurrent protective device | Internal fuses are provided | P |
| 1.7.2.4 | IT power distribution systems | | P |
| 1.7.2.5 | Operator access with a tool | No access | N/A |
| 1.7.2.6 | Ozone | - | N/A |
| 1.7.3 | Short duty cycles | Unit is continous operation | N/A |
| 1.7.4 | Supply voltage adjustment ..... : | No adjustment required | N/A |
| | Methods and means of adjustment; reference to installation instructions ..... : | - | N/A |
| 1.7.5 | Power outlets on the equipment ..... : | No standard power outlet provided | N/A |

| IEC 60950-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.7.6 | Fuse identification (marking, special fusing characteristics, cross-reference) ..... : | Fuses are not user accessible. Fuse manufacturer and part number provided on bill of material for factory servicing | P |
| 1.7.7 | Wiring terminals | | N/A |
| 1.7.7.1 | Protective earthing and bonding terminals ..... : | Protective bonding terminal provided by a pin of the certified input connector. It is not required to provide the bonding symbol on a component type device. | P |
| 1.7.7.2 | Terminals for a.c. mains supply conductors | Pin connector provided | N/A |
| 1.7.7.3 | Terminals for d.c. mains supply conductors | - | N/A |
| 1.7.8 | Controls and indicators | The LED indicators in the front provide equipment status only. | N/A |
| 1.7.8.1 | Identification, location and marking ..... : | Not provided | N/A |
| 1.7.8.2 | Colours ..... : | Only functional indications use color. | N/A |
| 1.7.8.3 | Symbols according to IEC 60417..... : | Unit has no on off switch | N/A |
| 1.7.8.4 | Markings using figures ..... : | Figures are not used | N/A |
| 1.7.9 | Isolation of multiple power sources ..... : | End product consideration, if redundant power supply used | N/A |
| 1.7.10 | Thermostats and other regulating devices ..... : | No thermostats and other regulating devices | N/A |
| 1.7.11 | Durability | UL approved label systems. The durability of marking test performed. | P |
| 1.7.12 | Removable parts | No removable parts | N/A |
| 1.7.13 | Replaceable batteries ..... : | No batteries employed | N/A |
| | Language(s) .....: | | — |
| 1.7.14 | Equipment for restricted access locations ..... : | Unit is intended for building-in | N/A |

| | | | |
|---|---|---|---|
| **2** | **PROTECTION FROM HAZARDS** | | P |
| **2.1** | **Protection from electric shock and energy hazards** | | N/A |
| 2.1.1 | Protection in operator access areas | End product consideration | N/A |
| 2.1.1.1 | Access to energized parts | End product consideration | N/A |
| | Test by inspection ..... : | To be evaluated in the end application | N/A |
| | Test with test finger (Figure 2A) ..... : | To be evaluated in the end application | N/A |
| | Test with test pin (Figure 2B) ..... : | To be evaluated in the end application | N/A |
| | Test with test probe (Figure 2C) ..... : | To be evaluated in the end application | N/A |
| 2.1.1.2 | Battery compartments | No battery comparment | N/A |
| 2.1.1.3 | Access to ELV wiring | No access to ELV provided | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Working voltage (Vpeak or Vrms); minimum distance through insulation (mm) | (See tables 2.10.2 and 2.10.5) | — |
| 2.1.1.4 | Access to hazardous voltage circuit wiring | For building into other equipment | N/A |
| 2.1.1.5 | Energy hazards ..... : | 48-58Vdc output has energy greater than 240VA. | N/A |
| 2.1.1.6 | Manual controls | None used | N/A |
| 2.1.1.7 | Discharge of capacitors in equipment | See below | P |
| | Measured voltage (V); time-constant (s)..... : | 0V after 1 sec. Test repeated 10 times. | — |
| 2.1.1.8 | Energy hazards – d.c. mains supply | Not connected to d.c. mains | N/A |
| | a) Capacitor connected to the d.c. mains supply .. : | | N/A |
| | b) Internal battery connected to the d.c. mains supply ..... : | | N/A |
| 2.1.1.9 | Audio amplifiers ..... : | None provided | N/A |
| 2.1.2 | Protection in service access areas | End product consideration | N/A |
| 2.1.3 | Protection in restricted access locations | End product consideration | N/A |
| **2.2** | **SELV circuits** | | P |
| 2.2.1 | General requirements | All voltages intended to be accessible in end product are less than 60Vdc | P |
| 2.2.2 | Voltages under normal conditions (V) ..... : | - | P |
| 2.2.3 | Voltages under fault conditions (V) ..... : | Under single fault condition, the output voltages did not exceed 42.4Vpeak or 60Vdc. | P |
| 2.2.4 | Connection of SELV circuits to other circuits ..... : | SELV circuit is only connected to other SELV circuits. SELV circuit separated from primary by reinforced insulation. | P |
| **2.3** | **TNV circuits** | | N/A |
| 2.3.1 | Limits | No TNV circuit | N/A |
| | Type of TNV circuits..... : | No TNV circuit | — |
| 2.3.2 | Separation from other circuits and from accessible parts | No TNV circuit | N/A |
| 2.3.2.1 | General requirements | No TNV circuit | N/A |
| 2.3.2.2 | Protection by basic insulation | No TNV circuit | N/A |
| 2.3.2.3 | Protection by earthing | No TNV circuit | N/A |
| 2.3.2.4 | Protection by other constructions ..... : | No TNV circuit | N/A |
| 2.3.3 | Separation from hazardous voltages | No TNV circuit | N/A |
| | Insulation employed ..... : | No TNV circuit | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.3.4 | Connection of TNV circuits to other circuits | No TNV circuit | N/A |
| | Insulation employed ..... : | No TNV circuit | — |
| 2.3.5 | Test for operating voltages generated externally | No TNV circuit | N/A |
| **2.4** | **Limited current circuits** | | N/A |
| 2.4.1 | General requirements | No limited current circuit | N/A |
| 2.4.2 | Limit values | - | N/A |
| | Frequency (Hz) ..... : | - | — |
| | Measured current (mA) ..... : | - | — |
| | Measured voltage (V) ..... : | - | — |
| | Measured circuit capacitance (nF or µF) ..... : | - | — |
| 2.4.3 | Connection of limited current circuits to other circuits | - | N/A |
| **2.5** | **Limited power sources** | | N/A |
| | a) Inherently limited output | No limited power sources | N/A |
| | b) Impedance limited output | - | N/A |
| | c) Regulating network or IC current limiter, limits output under normal operating and single fault condition | - | N/A |
| | Use of integrated circuit (IC) current limiters | - | N/A |
| | d) Overcurrent protective device limited output | - | N/A |
| | Max. output voltage (V), max. output current (A), max. apparent power (VA) ..... : | - | — |
| | Current rating of overcurrent protective device (A) : | - | — |
| **2.6** | **Provisions for earthing and bonding** | | P |
| 2.6.1 | Protective earthing | Protective bonding pins are integral parts of the input connector. | N/A |
| 2.6.2 | Functional earthing | Not used | N/A |
| | Use of symbol for functional earthing .....: | Not used | N/A |
| 2.6.3 | Protective earthing and protective bonding conductors | See 2.6.1 | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.6.3.1 | General | The earthing pins of the input connector (PROTECTIVE BONDING TERMINAL) are mechanically secured and soldered to the ground plane of the printed circuit board. The ground plane is bonded to the power supply chassis via multiple ground studs using compression type lock washers and screw combination. | P |
| 2.6.3.2 | Size of protective earthing conductors | Protective bonding only provided | N/A |
| | Rated current (A), cross-sectional area ($mm^2$), AWG ..... : | -- | — |
| 2.6.3.3 | Size of protective bonding conductors | The current carrying capacity of ground plane is higher than the current carrying of the traces | P |
| | Rated current (A), cross-sectional area ($mm^2$), AWG ..... : | 2.4$mm^2$ for all models, except CP2725; 3.1$mm^2$ for CP2725. | — |
| | Protective current rating (A), cross-sectional area ($mm^2$), AWG ..... : | 25A, 2.4$mm^2$ for all models, except CP2725; 3.1$mm^2$ for CP2725. | P |
| 2.6.3.4 | Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min)..... : | The protective bonding ground plane on the PWB has cross sectional area that complies with Table 2D.<br>0.003 Ω, 0.1193V; Test current 40A for all models except CP2725 series<br>0.003Ω, 0.1607V; Test current 50A for Model CP2725 | P |
| 2.6.3.5 | Colour of insulation ..... : | | N/A |
| 2.6.4 | Terminals | PWB traces used | P |
| 2.6.4.1 | General | PWB traces used | P |
| 2.6.4.2 | Protective earthing and bonding terminals | No protective earthing terminal. Protective bonding pin is an integral part oof the input connector | P |
| | Rated current (A), type, nominal thread diameter (mm)..... : | -- | — |
| 2.6.4.3 | Separation of the protective earthing conductor from protective bonding conductors | No protective earthing terminal | N/A |
| 2.6.5 | Integrity of protective earthing | No protective earthing terminal | N/A |
| 2.6.5.1 | Interconnection of equipment | For building-in | N/A |
| 2.6.5.2 | Components in protective earthing conductors and protective bonding conductors | No protective earthing conductor | N/A |
| 2.6.5.3 | Disconnection of protective earth | Equipment is for building-in. | N/A |
| 2.6.5.4 | Parts that can be removed by an operator | Equipment is for building-in. | N/A |
| 2.6.5.5 | Parts removed during servicing | No servicing in the field | N/A |
| 2.6.5.6 | Corrosion resistance | Complies with Annex J. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.6.5.7 | Screws for protective bonding | | P |
| 2.6.5.8 | Reliance on telecommunication network or cable distribution system | Not reliant on telecom network or cable distribution system | N/A |
| **2.7** | **Overcurrent and earth fault protection in primary circuits** | | P |
| 2.7.1 | Basic requirements | Fuses F1 and F2 are rated 20A for Models CP1800, CP2000, CP2100 and 25A for Models CP2725, CP1400 | P |
| | Instructions when protection relies on building installation | 60A branch circuit protection required in end-use application | P |
| 2.7.2 | Faults not simulated in 5.3.7 | Provided in end-use application | P |
| 2.7.3 | Short-circuit backup protection | 60A branch circuit protection required in end-use application | P |
| 2.7.4 | Number and location of protective devices ..... : | 2 fuses (F1, F2) provided in the current carrying traces. | P |
| 2.7.5 | Protection by several devices | F1 and F2 are adjacent each other | P |
| 2.7.6 | Warning to service personnel ..... : | “CAUTION: Double Pole / Neutral Fusing” is provided in instructions. | P |
| **2.8** | **Safety interlocks** | | N/A |
| 2.8.1 | General principles | No safety interlock provided | N/A |
| 2.8.2 | Protection requirements | - | N/A |
| 2.8.3 | Inadvertent reactivation | - | N/A |
| 2.8.4 | Fail-safe operation | - | N/A |
| | Protection against extreme hazard | - | N/A |
| 2.8.5 | Moving parts | - | N/A |
| 2.8.6 | Overriding | - | N/A |
| 2.8.7 | Switches, relays and their related circuits | - | N/A |
| 2.8.7.1 | Separation distances for contact gaps and their related circuits (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 | - | N/A |
| 2.8.8 | Mechanical actuators | - | N/A |
| **2.9** | **Electrical insulation** | | P |
| 2.9.1 | Properties of insulating materials | Natural rubber, materials containing asbestors and hygroscopic materials are not used as insulation. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.9.2 | Humidity conditioning | 120 hours at 93% humidity at 40°C | P |
| | Relative humidity (%), temperature (°C) ..... : | 40°C / 93% RH | — |
| 2.9.3 | Grade of insulation | BASIC INSULATION provided between primary and earth. REINFORCED INSULATION between primary and secondary | P |
| 2.9.4 | Separation from hazardous voltages | SELV circuits separated from hazardous voltage circuits by RI. | P |
| | Method(s) used ..... : | Method 1 | — |

| | | | |
|---|---|---|---|
| **2.10** | **Clearances, creepage distances and distances through insulation** | | P |
| 2.10.1 | General | | P |
| 2.10.1.1 | Frequency ..... : | Less than 30K Hz | P |
| 2.10.1.2 | Pollution degrees ..... : | 2 | P |
| 2.10.1.3 | Reduced values for functional insulation | 5.3.4 c used | P |
| 2.10.1.4 | Intervening unconnected conductive parts | - | N/A |
| 2.10.1.5 | Insulation with varying dimensions | Such method not used. | N/A |
| 2.10.1.6 | Special separation requirements | - | N/A |
| 2.10.1.7 | Insulation in circuits generating starting pulses | No discharge lamps | N/A |
| 2.10.2 | Determination of working voltage | See table 2.10.3 and 2.10.4 | P |
| 2.10.2.1 | General | - | P |
| 2.10.2.2 | RMS working voltage | See table 2.10.3 and 2.10.4 | P |
| 2.10.2.3 | Peak working voltage | See table 2.10.3 and 2.10.4 | P |
| 2.10.3 | Clearances | See table 2.10.3 and 2.10.4 | P |
| 2.10.3.1 | General | See table 2.10.3 and 2.10.4 | P |
| 2.10.3.2 | Mains transient voltages | | P |
| | a) AC mains supply ..... : | Over voltage category II; 2500V assumed | P |
| | b) Earthed d.c. mains supplies ..... : | - | N/A |
| | c) Unearthed d.c. mains supplies ..... : | - | N/A |
| | d) Battery operation ..... : | - | N/A |
| 2.10.3.3 | Clearances in primary circuits | See table 2.10.3 and 2.10.4 | P |
| 2.10.3.4 | Clearances in secondary circuits | See table 2.10.3 and 2.10.4 | P |
| 2.10.3.5 | Clearances in circuits having starting pulses | - | N/A |
| 2.10.3.6 | Transients from a.c. mains supply ..... : | 2500Vpk used | P |
| 2.10.3.7 | Transients from d.c. mains supply ..... : | | N/A |
| 2.10.3.8 | Transients from telecommunication networks and cable distribution systems ..... : | - | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.10.3.9 | Measurement of transient voltage levels | - | N/A |
| | a) Transients from a mains supply | - | N/A |
| | For an a.c. mains supply ..... : | - | N/A |
| | For a d.c. mains supply ..... : | - | N/A |
| | b) Transients from a telecommunication network : | - | N/A |
| 2.10.4 | Creepage distances | See table 2.10.3 and 2.10.4 | P |
| 2.10.4.1 | General | - | P |
| 2.10.4.2 | Material group and comparative tracking index | - | P |
| | CTI tests..... : | Material group IIIb is assumed to be used | — |
| 2.10.4.3 | Minimum creepage distances | See table 2.10.3 and 2.10.4 | P |
| 2.10.5 | Solid insulation | | P |
| 2.10.5.1 | General | - | P |
| 2.10.5.2 | Distances through insulation | See appended table 2.10.5 | P |
| 2.10.5.3 | Insulating compound as solid insulation | | N/A |
| 2.10.5.4 | Semiconductor devices | Opto couplers are approved | P |
| 2.10.5.5. | Cemented joints | PCB tested | P |
| 2.10.5.6 | Thin sheet material – General | One layer of FORMEX insulator is used for basic insulation.<br>Electric strength test was conducted at 3000Vdc for 1 minute. | P |
| 2.10.5.7 | Separable thin sheet material | | P |
| | Number of layers (pcs)..... : | 3 | — |
| 2.10.5.8 | Non-separable thin sheet material | | N/A |
| 2.10.5.9 | Thin sheet material – standard test procedure | | N/A |
| | Electric strength test | - | — |
| 2.10.5.10 | Thin sheet material – alternative test procedure | | N/A |
| | Electric strength test | - | — |
| 2.10.5.11 | Insulation in wound components | | N/A |
| 2.10.5.12 | Wire in wound components | | N/A |
| | Working voltage ..... : | | N/A |
| | a) Basic insulation not under stress ..... : | | N/A |
| | b) Basic, supplementary, reinforced insulation ..... : | | N/A |
| | c) Compliance with Annex U ..... : | | N/A |
| | Two wires in contact inside wound component; angle between 45° and 90° ..... : | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.10.5.13 | Wire with solvent-based enamel in wound components | | N/A |
| | Electric strength test | - | — |
| | Routine test | See table 2.10.3 and 2.10.4 | N/A |
| 2.10.5.14 | Additional insulation in wound components | | N/A |
| | Working voltage ..... : | | N/A |
| | - Basic insulation not under stress ..... : | | N/A |
| | - Supplementary, reinforced insulation ..... : | | N/A |
| 2.10.6 | Construction of printed boards | - | P |
| 2.10.6.1 | Uncoated printed boards | See table 2.10.3 and 2.10.4. Traces comply with creepahe distances | P |
| 2.10.6.2 | Coated printed boards | Not relied upon for safety | P |
| 2.10.6.3 | Insulation between conductors on the same inner surface of a printed board | The traces of the primary input circuit and SELV secondary output circuit on the same inner surface of the printed wiring board have been evaluated to the requirement of cemented joint in 2.10.5.5. | P |
| 2.10.6.4 | Insulation between conductors on different layers of a printed board | Thickness minimum 0.43mm | P |
| | Distance through insulation | (See table 2.10.5) | P |
| | Number of insulation layers (pcs) ..... : | Minimum 2 layers of prepreg | P |
| 2.10.7 | Component external terminations | No coating used | N/A |
| 2.10.8 | Tests on coated printed boards and coated components | | N/A |
| 2.10.8.1 | Sample preparation and preliminary inspection | - | N/A |
| 2.10.8.2 | Thermal conditioning | - | N/A |
| 2.10.8.3 | Electric strength test | (See table 5.2) | N/A |
| 2.10.8.4 | Abrasion resistance test | - | N/A |
| 2.10.9 | Thermal cycling | Performed on cemented joints.<br>Cycled between 130°C and 0°C | P |
| 2.10.10 | Test for Pollution Degree 1 environment and insulating compound | | N/A |
| 2.10.11 | Tests for semiconductor devices and cemented joints | Opto couplers and isolators are approved types and pass the requirements. 3 samples of PWB board are subjected to cemented joint test per 2.10.5.5 | P |
| 2.10.12 | Enclosed and sealed parts | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| **3** | **WIRING, CONNECTIONS AND SUPPLY** | | P |
| **3.1** | **General** | | N/A |
| 3.1.1 | Current rating and overcurrent protection | PWB traces are adequately dimensioned and suitable for the current application. | P |
| 3.1.2 | Protection against mechanical damage | | P |
| 3.1.3 | Securing of internal wiring | No discrete internal conductors used | N/A |
| 3.1.4 | Insulation of conductors | | N/A |
| 3.1.5 | Beads and ceramic insulators | No beads and ceramic insulators. | N/A |
| 3.1.6 | Screws for electrical contact pressure | Machine screws engage at least two threads | P |
| 3.1.7 | Insulating materials in electrical connections | Compression type spring washers used for connections | P |
| 3.1.8 | Self-tapping and spaced thread screws | Such screws are not used. | N/A |
| 3.1.9 | Termination of conductors | No discrete internal conductors used | N/A |
| | 10 N pull test | | N/A |
| 3.1.10 | Sleeving on wiring | | N/A |
| **3.2** | **Connection to a mains supply** | | N/A |
| 3.2.1 | Means of connection | Input connector plugs into a mate in the backplane of the end product | N/A |
| 3.2.1.1 | Connection to an a.c. mains supply | No direct connection to the mains. | N/A |
| 3.2.1.2 | Connection to a d.c. mains supply | AC-operated unit. | N/A |
| 3.2.2 | Multiple supply connections | Single supply connection. | N/A |
| 3.2.3 | Permanently connected equipment | Equipment is for building-in | N/A |
| | Number of conductors, diameter of cable and conduits (mm) .....: | | — |
| 3.2.4 | Appliance inlets | No appliance inlet | N/A |
| 3.2.5 | Power supply cords | No detachable supply cord provided | N/A |
| 3.2.5.1 | AC power supply cords | No AC power supply cords | N/A |
| | Type .....: | | — |
| | Rated current (A), cross-sectional area ($mm^2$), AWG .....: | | — |
| 3.2.5.2 | DC power supply cords | AC operated unit. | N/A |
| 3.2.6 | Cord anchorages and strain relief | No power supply cord provided | N/A |
| | Mass of equipment (kg), pull (N) .....: | | — |
| | Longitudinal displacement (mm) .....: | | — |
| 3.2.7 | Protection against mechanical damage | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.2.8 | Cord guards | | N/A |
| | Diameter or minor dimension D (mm); test mass (g) | | — |
| | Radius of curvature of cord (mm) ..... : | | — |
| 3.2.9 | Supply wiring space | Not used | N/A |
| **3.3** | **Wiring terminals for connection of external conductors** | | N/A |
| 3.3.1 | Wiring terminals | No discrete internal conductors used | 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 | Not used | N/A |
| | Rated current (A), cord/cable type, cross-sectional area ($mm^2$) ..... : | Not used | — |
| 3.3.5 | Wiring terminal sizes | Not used | N/A |
| | Rated current (A), type, nominal thread diameter (mm) ..... : | Not used | — |
| 3.3.6 | Wiring terminal design | Not used | N/A |
| 3.3.7 | Grouping of wiring terminals | Not used | N/A |
| 3.3.8 | Stranded wire | Not used | N/A |
| **3.4** | **Disconnection from the mains supply** | | N/A |
| 3.4.1 | General requirement | End product consideration | N/A |
| 3.4.2 | Disconnect devices | End product consideration | N/A |
| 3.4.3 | Permanently connected equipment | Not such equipment | N/A |
| 3.4.4 | Parts which remain energized | For building into other equipment | N/A |
| 3.4.5 | Switches in flexible cords | For building into other equipment | N/A |
| 3.4.6 | Number of poles - single-phase and d.c. equipment | No disconnect device, end product consideration | N/A |
| 3.4.7 | Number of poles - three-phase equipment | Single-phase equipment | N/A |
| 3.4.8 | Switches as disconnect devices | No switch is provided | N/A |
| 3.4.9 | Plugs as disconnect devices | For building into other equipment | N/A |
| 3.4.10 | Interconnected equipment | End product consideration | N/A |
| 3.4.11 | Multiple power sources | Not such equipment | N/A |
| **3.5** | **Interconnection of equipment** | | P |
| 3.5.1 | General requirements | Interconnection of the power supply outputs with other circuits is to be evaluated in the end product. | P |
| 3.5.2 | Types of interconnection circuits ..... : | SELV | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.5.3 | ELV circuits as interconnection circuits | - | N/A |
| 3.5.4 | Data ports for additional equipment | - | N/A |
| **4** | **PHYSICAL REQUIREMENTS** | | N/A |
| **4.1** | **Stability** | | N/A |
| | Angle of 10° | Component for building in. | N/A |
| | Test force (N) ..... : | - | N/A |
| **4.2** | **Mechanical strength** | | P |
| 4.2.1 | General | For building into other equipment | N/A |
| | Rack-mounted equipment. | Not such equipment | N/A |
| 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 | For building into other equipment | N/A |
| 4.2.5 | Impact test | Component for building-in | N/A |
| | Fall test | | N/A |
| | Swing test | | N/A |
| 4.2.6 | Drop test; height (mm) ..... : | Not hand-held equipment | N/A |
| 4.2.7 | Stress relief test | Metal chassis | N/A |
| 4.2.8 | Cathode ray tubes | No cathode ray tubes used | N/A |
| | Picture tube separately certified ..... : | - | N/A |
| 4.2.9 | High pressure lamps | None used | N/A |
| 4.2.10 | Wall or ceiling mounted equipment; force (N) ..... : | Not for wall or ceiling mounting | N/A |
| **4.3** | **Design and construction** | | P |
| 4.3.1 | Edges and corners | All edges and corners are well rounded. | P |
| 4.3.2 | Handles and manual controls; force (N) .....: | No lifting handles and manual controls | N/A |
| 4.3.3 | Adjustable controls | No adjustible controls provided | N/A |
| 4.3.4 | Securing of parts | Lock washers, nuts and screws used | P |
| 4.3.5 | Connection by plugs and sockets | Connectors complying with IEC 60083 and IEC 60320 are not used in SELV circuits. | N/A |
| 4.3.6 | Direct plug-in equipment | Not a direct plug-in equipment | N/A |
| | Torque ..... : | - | — |
| | Compliance with the relevant mains plug standard: | - | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.3.7 | Heating elements in earthed equipment | None provided | N/A |
| 4.3.8 | Batteries | None provided | N/A |
| | - Overcharging of a rechargeable battery | - | N/A |
| | - Unintentional charging of a non-rechargeable battery | - | N/A |
| | - Reverse charging of a rechargeable battery | - | N/A |
| | - Excessive discharging rate for any battery | - | N/A |
| 4.3.9 | Oil and grease | None used | N/A |
| 4.3.10 | Dust, powders, liquids and gases | None used | N/A |
| 4.3.11 | Containers for liquids or gases | None used | N/A |
| 4.3.12 | Flammable liquids ..... : | None used | N/A |
| | Quantity of liquid (l) ..... : | - | N/A |
| | Flash point (°C) ..... : | - | N/A |
| 4.3.13 | Radiation | No radiation generated | N/A |
| 4.3.13.1 | General | No radiation generated | N/A |
| 4.3.13.2 | Ionizing radiation | No radiation generated | 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 | No UV radiation | 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 | Lasers (including laser diodes) and LEDs | LEDs are used for indicating only. | N/A |
| 4.3.13.5.1 | Lasers (including laser diodes) | - | N/A |
| | Laser class ..... : | Class 1 | — |
| 4.3.13.5.2 | Light emitting diodes (LEDs) | Class 1 LEDs used | |
| 4.3.13.6 | Other types ..... : | None used | N/A |

| **4.4** | **Protection against hazardous moving parts** | | P |
|---|---|---|---|
| 4.4.1 | General | Component for building in. | N/A |
| 4.4.2 | Protection in operator access areas ..... : | For building into other equipment | N/A |
| | Household and home/office document/media shredders | Not such equipment | N/A |
| 4.4.3 | Protection in restricted access locations ..... : | | N/A |
| 4.4.4 | Protection in service access areas | Component for building in. | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.4.5 | Protection against moving fan blades | Fan not accessible | P |
| 4.4.5.1 | General | - | N/A |
| | Not considered to cause pain or injury. a) ..... : | - | N/A |
| | Is considered to cause pain, not injury. b) ..... : | - | N/A |
| | Considered to cause injury. c) ..... : | - | N/A |
| 4.4.5.2 | Protection for users | For building-in | N/A |
| | Use of symbol or warning ..... : | - | N/A |
| 4.4.5.3 | Protection for service persons | For building-in | N/A |
| | Use of symbol or warning ..... : | - | N/A |
| **4.5** | **Thermal requirements** | | P |
| 4.5.1 | General | - | P |
| 4.5.2 | Temperature tests | (see appended table 4.5) | P |
| | Normal load condition per Annex L ..... : | Operated at extremes of input voltage range with rated load until steady conditions | — |
| 4.5.3 | Temperature limits for materials | (see appended table 4.5) | P |
| 4.5.4 | Touch temperature limits | (see appended table 4.5) | P |
| 4.5.5 | Resistance to abnormal heat ..... : | The transformer bobbins and input connector housing are used within their temperature and flammability rating. Other plastic parts are used within their UL recognized RTI rating. | P |
| **4.6** | **Openings in enclosures** | | N/A |
| 4.6.1 | Top and side openings | Equipment is for building-in. | N/A |
| | Dimensions (mm) ..... : | - | — |
| 4.6.2 | Bottoms of fire enclosures | | N/A |
| | Construction of the bottomm, dimensions (mm) .. : | - | — |
| 4.6.3 | Doors or covers in fire enclosures | | N/A |
| 4.6.4 | Openings in transportable equipment | | N/A |
| 4.6.4.1 | Constructional design measures | - | N/A |
| | Dimensions (mm) ..... : | - | — |
| 4.6.4.2 | Evaluation measures for larger openings | For building into other equipment | N/A |
| 4.6.4.3 | Use of metallized parts | | N/A |
| 4.6.5 | Adhesives for constructional purposes | - | N/A |
| | Conditioning temperature (°C), time (weeks)..... : | - | — |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| **4.7** | **Resistance to fire** | | P |
| 4.7.1 | Reducing the risk of ignition and spread of flame | All materials are used within their electrical and temperature ratings. | P |
| | Method 1, selection and application of components wiring and materials | (see appended table 4.7) | P |
| | Method 2, application of all of simulated fault condition tests | Performed fault testing for applicable primary and secondary components | P |
| 4.7.2 | Conditions for a fire enclosure | To be considered in end system | N/A |
| 4.7.2.1 | Parts requiring a fire enclosure | To be considered in end system | N/A |
| 4.7.2.2 | Parts not requiring a fire enclosure | To be considered in end system | N/A |
| 4.7.3 | Materials | | P |
| 4.7.3.1 | General | All materials are used within their electrical and temperature ratings | P |
| 4.7.3.2 | Materials for fire enclosures | For building into other equipment | N/A |
| 4.7.3.3 | Materials for components and other parts outside fire enclosures | | N/A |
| 4.7.3.4 | Materials for components and other parts inside fire enclosures | All plastic parts rated V-1 min; all PWBs rated 130°C, V-0. | P |
| 4.7.3.5 | Materials for air filter assemblies | No air filters | N/A |
| 4.7.3.6 | Materials used in high-voltage components | No such 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 | Equipment meets the requirements for touch current and protective conductor current. | P |
| 5.1.2 | Configuration of equipment under test (EUT) | EUT is not interconnected | P |
| 5.1.2.1 | Single connection to an a.c. mains supply | - | P |
| 5.1.2.2 | Redundant multiple connections to an a.c. mains supply | - | N/A |
| 5.1.2.3 | Simultaneous multiple connections to an a.c. mains supply | - | N/A |
| 5.1.3 | Test circuit | Fig. 5A | P |
| 5.1.4 | Application of measuring instrument | Simpson 228 test meter used | P |
| 5.1.5 | Test procedure | Annex D / (IEC60950-1, Fig. 5B / IEC 60990 Fig. 12, and 13) | P |
| 5.1.6 | Test measurements | Simpson 228 | P |
| | Supply voltage (V) ..... : | 254Vac/60Hz for all models except CP2725 Series; 275Vac/60Hz for CP2725 Series | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Measured touch current (mA) ..... : | 3.0mA Max for all models except CP2725 Series; 2.90mA Max for CP2725 Series | — |
| | Max. allowed touch current (mA) ..... : | 3.5mA | — |
| | Measured protective conductor current (mA) ..... : | Not used | — |
| | Max. allowed protective conductor current (mA)... : | Not used | — |
| 5.1.7 | Equipment with touch current exceeding 3,5 mA | 3.5mA was not exceeded | N/A |
| 5.1.7.1 | General ..... : | - | N/A |
| 5.1.7.2 | Simultaneous multiple connections to the supply | - | N/A |
| 5.1.8 | Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks | - | N/A |
| 5.1.8.1 | Limitation of the touch current to a telecommunication network or to a cable distribution system | - | N/A |
| | Supply voltage (V) ..... : | - | — |
| | Measured touch current (mA) ..... : | - | — |
| | Max. allowed touch current (mA) ..... : | - | — |
| 5.1.8.2 | Summation of touch currents from telecommunication networks | - | N/A |
| | a) EUT with earthed telecommunication ports ..... : | - | N/A |
| | b) EUT whose telecommunication ports have no reference to protective earth | - | N/A |

| | | | |
|---|---|---|---|
| **5.2** | **Electric strength** | | P |
| 5.2.1 | General | (see appended table 5.2) | P |
| 5.2.2 | Test procedure | 3000Vdc for Basic insulation. 4242Vdc for Reinforced insulation. No insulation breakdown. | 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 | Cooling fans are certified type | P |
| 5.3.3 | Transformers | (see appended Annex C) | P |
| 5.3.4 | Functional insulation ..... : | Complies with the requirements of methods (b) and (c). | P |
| 5.3.5 | Electromechanical components | - | N/A |
| 5.3.6 | Audio amplifiers in ITE ..... : | - | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.3.7 | Simulation of faults | Output connectors overloaded. Transformer temperatures measured for compliance with Annex C during test. No other components where failure could adversely affect SUPPLEMENTARY or REINFORCED INSULATION. | P |
| 5.3.8 | Unattended equipment | - | N/A |
| 5.3.9 | Compliance criteria for abnormal operating and fault conditions | No fire, emision of molten metal or deformation was noted during the tests. | P |
| 5.3.9.1 | During the tests | No fire, emision of molten metal or deformation was noted during the tests. | P |
| 5.3.9.2 | After the tests | Electric strength tests performed after each abnormal and fault test. | 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 | Not such equipment | N/A |
| | Supply 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 | Not such equipment | N/A |
| 6.2.2 | Electric strength test procedure | - | N/A |
| 6.2.2.1 | Impulse test | - | N/A |
| 6.2.2.2 | Steady-state test | - | N/A |
| 6.2.2.3 | Compliance criteria | - | N/A |
| **6.3** | **Protection of the telecommunication wiring system from overheating** | | N/A |
| | Max. output current (A) ..... : | Not such equipment | — |
| | Current limiting method ..... : | - | — |
| **7** | **CONNECTION TO CABLE DISTRIBUTION SYSTEMS** | | N/A |
| **7.1** | **General** | Not such equipment | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.2 | Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment | - | N/A |
| 7.3 | Protection of equipment users from overvoltages on the cable distribution system | - | N/A |
| 7.4 | Insulation between primary circuits and cable distribution systems | - | N/A |
| 7.4.1 | General | Not such equipment | N/A |
| 7.4.2 | Voltage surge test | - | N/A |
| 7.4.3 | Impulse test | - | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **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 (see IEC 60695-11-3) | | N/A |
| | Flame A, B, C or D ..... : | | — |
| 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; temperature (°C) ..... : | | N/A |
| A.2.3 | Mounting of samples ..... : | | N/A |
| A.2.4 | Test flame (see IEC 60695-11-4) | | N/A |
| | Flame A, B or C ..... : | | — |
| 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 60695-11-5, cl. 5 and 9 | | 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 |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|---|---|---|---|
| **B** | **ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)** | | P |
| **B.1** | **General requirements** | DC fan is certified type | P |
| | Position ..... : | | — |
| | Manufacturer ..... : | | — |
| | Type ..... : | | — |
| | Rated values ..... : | | — |
| **B.2** | **Test conditions** | - | N/A |
| **B.3** | **Maximum temperatures** | - | N/A |
| **B.4** | **Running overload test** | - | 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.6.1 | General | - | N/A |
| B.6.2 | Test procedure | - | N/A |
| B.6.3 | Alternative test procedure | - | N/A |
| B.6.4 | Electric strength test; test voltage (V) ..... : | - | N/A |
| **B.7** | **Locked-rotor overload test for d.c. motors in secondary circuits** | Fan rotor locked; no hazard | P |
| B.7.1 | General | - | N/A |
| B.7.2 | Test procedure | - | N/A |
| B.7.3 | Alternative test procedure | - | N/A |
| B.7.4 | Electric strength test; test voltage (V) ..... : | - | N/A |
| **B.8** | **Test for motors with capacitors** | - | N/A |
| **B.9** | **Test for three-phase motors** | - | 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 ..... : | (See appended table 1.5.1) | — |
| | Manufacturer ..... : | (See appended table 1.5.1) | — |
| | Type ..... : | (See appended table 1.5.1) | — |
| | Rated values ..... : | (See appended table 1.5.1) | — |
| | Method of protection ..... : | Input fuse | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **C.1** | **Overload test** | (see appended table 5.3) | P |
| **C.2** | **Insulation** | (see appended tables 5.2 and C2) | P |
| | Protection from displacement of windings ..... : | | P |
| **D** | **ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)** | | P |
| **D.1** | **Measuring instrument** | Simpson, Model 228 | P |
| **D.2** | **Alternative measuring instrument** | Alternative measuring instrument not used | N/A |
| **E** | **ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)** | | N/A |
| **F** | **ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10 and Annex G)** | | P |
| **G** | **ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES** | | N/A |
| **G.1** | **Clearances** | Not such equipment | N/A |
| G.1.1 | General | - | N/A |
| G.1.2 | 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 | Earthed d.c. mains supplies ..... : | - | N/A |
| G.2.3 | Unearthed d.c. mains supplies ..... : | - | N/A |
| G.2.4 | Battery operation ..... : | - | N/A |
| **G.3** | **Determination of telecommunication network transient voltage (V) ..... :** | - | N/A |
| **G.4** | **Determination of required withstand voltage (V)** | - | N/A |
| G.4.1 | Mains transients and internal repetitive peaks ..... : | - | N/A |
| G.4.2 | Transients from telecommunication networks ..... : | - | N/A |
| G.4.3 | Combination of transients | - | N/A |
| G.4.4 | Transients from cable distribution systems | - | N/A |
| **G.5** | **Measurement of transient voltages (V)** | - | N/A |
| | a) Transients from a mains supply | - | N/A |
| | For an a.c. mains supply | - | N/A |
| | For a d.c. mains supply | - | N/A |
| | b) Transients from a telecommunication network | - | N/A |
| **G.6** | **Determination of minimum clearances ..... :** | - | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| **H** | **ANNEX H, IONIZING RADIATION (see 4.3.13)** | | N/A |
| **J** | **ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)** | | P |
| | Metal(s) used ..... : | Steal plated with zinc | — |
| **K** | **ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)** | | N/A |
| K.1 | Making and breaking capacity | No thermal control is relied on for safety test. | 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 | - | N/A |
| **L** | **ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)** | | P |
| 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 | Power supply for use with business equipment | P |
| **M** | **ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)** | | N/A |
| M.1 | Introduction | - | N/A |
| M.2 | Method A | No telephone ringing signals | 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 |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3 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** | | — |
| **Q** | **ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)** | | P |
| | - Preferred climatic categories ..... : | VDRs are certified types, suitable for the application | P |
| | - Maximum continuous voltage ..... : | | P |
| | - Combination pulse current ..... : | | P |
| | Body of the VDR<br>Test according to IEC60695-11-5 ..... : | | P |
| | Body of the VDR.<br>Flammability class of material ( min V-1) ..... : | | P |
| **R** | **ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES** | | N/A |
| R.1 | Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2) | - | 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 |
| | | For building into other equipment | — |
| **U** | **ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)** | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | | | — |
| **V** | **ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)** | | P |
| V.1 | Introduction | - | P |
| V.2 | TN power distribution systems | Not to exceed 230 V | P |
| **W** | **ANNEX W, SUMMATION OF TOUCH CURRENTS** | | N/A |
| W.1 | Touch current from electronic circuits | Not required | N/A |
| W.1.1 | Floating circuits | - | N/A |
| W.1.2 | Earthed circuits | - | N/A |
| W.2 | Interconnection of several equipments | - | N/A |
| W.2.1 | Isolation | - | N/A |
| W.2.2 | Common return, isolated from earth | - | N/A |
| W.2.3 | Common return, connected to protective earth | - | N/A |
| **X** | **ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)** | | P |
| X.1 | Determination of maximum input current | Informative Annex considered | P |
| X.2 | Overload test procedure | Refer to s.c. 5.3 | P |
| **Y** | **ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)** | | N/A |
| Y.1 | Test apparatus ..... : | - | N/A |
| Y.2 | Mounting of test samples ..... : | - | N/A |
| Y.3 | Carbon-arc light-exposure apparatus ..... : | - | N/A |
| Y.4 | Xenon-arc light exposure apparatus ..... : | - | N/A |
| **Z** | **ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)** | | P |
| **AA** | **ANNEX AA, MANDREL TEST (see 2.10.5.8)** | | N/A |
| **BB** | **ANNEX BB, CHANGES IN THE SECOND EDITION** | | — |
| **CC** | **ANNEX CC, Evaluation of integrated circuit (IC) current limiters** | | N/A |
| CC.1 | General | None used | N/A |
| CC.2 | Test program 1 .....: | - | N/A |
| CC.3 | Test program 2 .....: | - | N/A |
| CC.4 | Test program 3 .....: | - | N/A |
| CC.5 | Compliance .....: | - | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **DD** | **ANNEX DD, Requirements for the mounting means of rack-mounted equipment** | | N/A |
| DD.1 | General | For building-in | N/A |
| DD.2 | Mechanical strength test, variable N……: | - | N/A |
| DD.3 | Mechanical strength test, 250 N, including end stops……: | - | N/A |
| DD.4 | Compliance……: | - | N/A |
| **EE** | **ANNEX EE, Household and home/office document/media shredders** | | N/A |
| EE.1 | General | End product consideration | N/A |
| EE.2 | Markings and instructions | - | N/A |
| | Use of markings or symbols……: | - | N/A |
| | Information of user instructions, maintenance and/or servicing instructions……: | - | N/A |
| EE.3 | Inadvertent reactivation test……: | - | N/A |
| EE.4 | Disconnection of power to hazardous moving parts: | - | N/A |
| | Use of markings or symbols……: | - | N/A |
| EE.5 | Protection against hazardous moving parts | - | N/A |
| | Test with test finger (Figure 2A) ……: | - | N/A |
| | Test with wedge probe (Figure EE1 and EE2) ……: | - | N/A |

| 1.5.1 | TABLE: Opto Electronic Devices | P |
|---|---|---|
| Manufacturer ..... : | Sharp / Vishay / Analog Devices | |
| Type..... : | PC123, PC814 / VO615, SFH628A (System J) / ADuM140X, ADuM240X series | |
| Separately tested..... : | VDE approval or equivalent | |
| Bridging insulation ..... : | Reinforced insulation | |
| External creepage distance..... : | 7.0 mm | |
| Internal creepage distance ..... : | 5.2 mm | |
| Distance through insulation ..... : | 0.4mm min. | |
| Tested under the following conditions ..... : | N/A | |
| Input..... : | | |
| Output..... : | | |
| **Supplementary information:** | | |

| 1.6.2 | TABLE: Electrical data (in normal conditions) | | | | | P |
|---|---|---|---|---|---|---|
| U (V) | I (A) | Irated (A) | P (W) | Fuse # | Ifuse (A) | Condition/status |
| **CP1800 Series** | | | | | | |
| 100.3 V / 60 Hz | 13.53 A | 15 A | 1356 W | F1/F2 | 13.53 A | Load 1 |
| 120.1 V / 60 Hz | 11.19 A | 15 A | 1344 W | F1/F2 | 11.19 A | Load 1 |
| 200.0 V / 60 Hz | 9.85 A | 10 A | 1966 VA | F1/F2 | 9.85 A | Load 2 |
| 208.0 V / 60 Hz | 9.47 A | 10 A | 1965 VA | F1/F2 | 9.47 A | Load 2 |
| 240.0 V / 60 Hz | 8.20 A | 10 A | 1965 VA | F1/F2 | 8.20 A | Load 2 |
| 100.0 V / 50 Hz | 13.69 A | 15 A | 1369 W | F1/F2 | 13.69 A | Load 1 |
| 120.0 V / 50 Hz | 11.30 A | 15 A | 1356 W | F1/F2 | 11.30 A | Load 1 |
| 200.0 V / 50 Hz | 9.86 A | 10 A | 1969 VA | F1/F2 | 9.86 A | Load 2 |
| 208.0 V / 50 Hz | 9.48 A | 10 A | 1971 VA | F1/F2 | 9.48 A | Load 2 |
| 240.0 V / 50 Hz | 8.20 A | 10 A | 1967 VA | F1/F2 | 8.20 A | Load 2 |

**Supplementary information:**

The steady state input current did not exceed the rated current by more than 10% under normal load.

Load 1: 52 V / 23.4 A, 5 V / 1 A = 1225 W

Load 2: 52 V / 34.6 A, 5 V / 1 A = 1805 W

| 1.6.2 | TABLE: Electrical data (in normal conditions) | | | | | P |
|---|---|---|---|---|---|---|
| U (V) | I (A) | Irated (A) | P (W) | Fuse # | Ifuse (A) | Condition/status |
| **CP2000 Series** | | | | | | |
| 200.0 V / 60 Hz | 11.08 A | 11 A | 2220 VA | F1 / F2 | 11.08 A | Load 1 |
| 208.0 V / 60 Hz | 10.66 A | 11 A | 2220 VA | F1 / F2 | 10.66 A | Load 1 |
| 240.0 V / 60 Hz | 9.21 A | 11 A | 2210 VA | F1 / F2 | 9.21 A | Load 1 |
| 199.6 V / 60 Hz | 10.92 A | 11 A | 2168 VA | F1 / F2 | 10.92 A | Load 2 |
| 207.6 V / 60 Hz | 10.49 A | 11 A | 2166 VA | F1 / F2 | 10.49 A | Load 2 |
| 239.7 V / 60 Hz | 9.09 A | 11 A | 2159 VA | F1 / F2 | 9.09 A | Load 2 |
| 200.0 V / 50 Hz | 11.09 A | 11 A | 2220 VA | F1 / F2 | 11.09 A | Load 1 |
| 208.0 V / 50 Hz | 10.66 A | 11 A | 2220 VA | F1 / F2 | 10.66 A | Load 1 |
| 240.0 V / 50 Hz | 9.21 A | 11 A | 2210 VA | F1 / F2 | 9.21 A | Load 1 |
| **Supplementary information:**<br>The steady state input current did not exceed the RATED CURRENT by more than 10%<br>Load 1: 52 V / 38.7 A, 5 V / 0.79 A = 2004 W<br>Load 2: 58 V / 34.6 A, 5 V / 0.79 A = 2006 W<br>The input and output rating @ 100-120Vac input is the same as the approved model CP1800. | | | | | | |

| 1.6.2 | TABLE: Electrical data (in normal conditions) | | | | | P |
|---|---|---|---|---|---|---|
| U (V) | I (A) | Irated (A) | P (W) | Fuse # | Ifuse (A) | Condition/status |
| **CP2000AC54SD** | | | | | | |
| 200.0 V, 60 Hz | 11.19 A | 11 A | 2.237 kW | F1 / F2 | 11.19 A | Load (see below) |
| 208.0 V, 60 Hz | 10.74 A | 11 A | 2.231 kW | F1 / F2 | 10.74 A | Load (see below) |
| 240.0 V, 60 Hz | 9.27 A | 11 A | 2.214 kW | F1 / F2 | 9.27 A | Load (see below) |
| 200.0 V, 50 Hz | 11.27 A | 11 A | 2.250 kW | F1 / F2 | 11.27 A | Load (see below) |
| 208.1 V, 50 Hz | 10.79 A | 11 A | 2.241 kW | F1 / F2 | 10.79 A | Load (see below) |
| 240.0 V, 50 Hz | 9.28 A | 11 A | 2.217 kW | F1 / F2 | 9.28 A | Load (see below) |
| **Supplementary information:**<br>The steady state input current did not exceed the RATED CURRENT by more than 10%.<br>Load: 51.2 V, 39.10 A, 2000 W / 5 V, 0.75 A, 3.75 W | | | | | | |

| 1.6.2 | TABLE: Electrical data (in normal conditions) | | | | | P |
|---|---|---|---|---|---|---|
| U (V) | I (A) | Irated (A) | P (W) | Fuse # | Ifuse (A) | Condition/status |
| **CP1400 Series** | | | | | | |
| 100.3 V / 60 Hz | 16.56 A | 19 A | 1652.2 W | F1 / F2 | 16.56 A | Normal Load |
| 120.3 V / 60 Hz | 13.41 A | 19 A | 1602.0 W | F1 / F2 | 13.41 A | Normal Load |
| 200.3 V / 60 Hz | 7.73 A | 19 A | 1523.4 W | F1 / F2 | 7.73 A | Normal Load |
| 207.8 V / 60 Hz | 7.45 A | 19 A | 1519.7 W | F1 / F2 | 7.45 A | Normal Load |
| 250.0 V / 60 Hz | 6.18 A | 19 A | 1503.8 W | F1 / F2 | 6.18 A | Normal Load |
| **Supplementary information:**<br>The steady state input current did not exceed the RATED CURRENT by more than 10%<br>Load: 52 V / 27.5 A, 5 V / 0.67 A = 1435 W | | | | | | |

| 1.6.2 | TABLE: Electrical data (in normal conditions) | | | | | P |
|---|---|---|---|---|---|---|
| U (V) | I (A) | Irated (A) | P (W) | Fuse # | Ifuse (A) | Condition/status |
| **CP2100 Series** | | | | | | |
| 199.1 V, 60 Hz | 11.78 A | 11 A | 2.366 kW | F1 / F2 | 11.78 A | Load (see below) |
| 207.2 V, 60 Hz | 11.41 A | 11 A | 2.360 kW | F1 / F2 | 11.41 A | Load (see below) |
| 238.6 V, 60 Hz | 9.82 A | 11 A | 2.344 kW | F1 / F2 | 9.82 A | Load (see below) |
| 199.2 V, 50 Hz | 11.77 A | 11 A | 2.365 kW | F1 / F2 | 11.77 A | Load (see below) |
| 207.2 V, 50 Hz | 11.31 A | 11 A | 2.358 kW | F1 / F2 | 11.31 A | Load (see below) |
| 239.2 V, 50 Hz | 9.79 A | 11 A | 2.340 kW | F1 / F2 | 9.79 A | Load (see below) |
| **Supplementary information:**<br>The steady state input current did not exceed the RATED CURRENT by more than 10%.<br>Load: 52 V, 40.3 A, 2100 W / 5 V, 0.75 A, 3.75 W = 2103.75 W | | | | | | |

| 1.6.2 | TABLE: Electrical data (in normal conditions) | | | | | P |
|---|---|---|---|---|---|---|
| U (V) | I (A) | Irated (A) | P (W) | Fuse # | Ifuse (A) | Condition/status |
| **Model CP2725** | | | | | | |
| 100.1 V, 60 Hz | 13.97 A | 15-12 A | 1.398 kW | F1 / F2 | 13.93 A | Load1 |
| 120.0 V, 60 Hz | 11.41 A | 15-12 A | 1.371 kW | F1 / F2 | 11.40 A | Load1 |
| 200.2 V, 60 Hz | 15.09 A | 15.60 A | 3.026 kW | F1 / F2 | 15.08 A | Load2 |
| 240.0 V, 60 Hz | 12.47 A | 15.60 A | 2.996 kW | F1 / F2 | 12.46 A | Load2 |
| 100.0 V, 50 Hz | 13.97 A | 15-12 A | 1.398 kW | F1 / F2 | 13.93 A | Load1 |
| 120.0 V, 50 Hz | 11.41 A | 15-12 A | 1.371 kW | F1 / F2 | 11.40 A | Load1 |
| 200.1 V, 50 Hz | 15.11 A | 15.60 A | 3.029 kW | F1 / F2 | 15.10 A | Load2 |
| 240.0 V, 50 Hz | 12.49 A | 15.60 A | 3.001 kW | F1 / F2 | 12.49 A | Load2 |
| 276.9V, 60Hz | 11.10 A | 15.60 A | 3.062 kW | F1 / F2 | 11.10 A | Load |
| **Supplementary information:** The steady state input current did not exceed the RATED CURRENT by more than 10%<br>Load 1: 54 V, 22.22 A, 1200 W / 5 V, 0.75 A, 3.75 W<br>Load 2: 53.93 V, 50.53 A, 2725 W / 5 V, 0.75 A, 3.75 W<br>Load 3: 52.78 V, 51.70 A, 2729 W / 5 V, 0.75 A, 3.75 W | | | | | | |

| 2.1.1.5 c) 1) | TABLE: max. V, A, VA test | | | | P |
|---|---|---|---|---|---|
| Voltage (rated) (V) | Current (rated) (A) | Voltage (max.) (V) | Current (max.) (A) | VA (max.) (VA) | |
| **CP1800 series** | | | | | |
| 52V | 34.6A | 52.20V | 37.4A | 1844.4W | |
| 5V | 0.75A | 4.84V | 1.53A | 7.47W | |
| **CP2000 series** | | | | | |
| 52V | 38.7A | 58.20V | 39.2A | 2016.7W | |
| 5V | 0.75A | 4.85V | 1.21A | 5.64W | |
| **CP2000AC54SD** | | | | | |
| 54V | 38.5A | 57.64V | 40.50A | 2060.64W | |
| **CP2725AC54** | | | | | |
| 54V | 50.46A | 59.40V | 54.08 | 2813W | |
| **Supplementary information:**<br>The max available power at the 44-58V output is more than energy hazard level – 240VA. | | | | | |

| 2.1.1.5 c) 2) | TABLE: stored energy | N/A |
|---|---|---|

| Capacitance C (µF) | Voltage U (V) | Energy E (J) |
|---|---|---|
| N/A | N/A | N/A |
| | | |

**Supplementary information:**

| 2.2 | TABLE: evaluation of voltage limiting components in SELV circuits | P |
|---|---|---|

| Component (measured between) | max voltage (V) (normal operation) | | Voltage Limiting Components |
|---|---|---|---|
| | V peak | V d.c. | |
| 52Vdc output+ and output- | -- | 52 | R243 |
| 52Vdc output+ and output- | -- | 52 | R127 |
| 52Vdc output+ and output- | -- | 52 | C103 |
| 52Vdc output+ and output- | -- | 52 | R606 |

| Fault test performed on voltage limiting components | Voltage measured (V) in SELV circuits. (V peak or V d.c.) |
|---|---|
| Open circuit of R243 | 53.4Vpk; Unit continued to operate without interruption or apparent damage. |
| Open circuit of R127 | 61.9Vpk < 200m Sec. Only 52V output hiccupped once instantly when fault was induced and recovered to normal operation while fault was still induced. |
| Short circuit of C103 | 60.5Vpk < 200m Sec. F100 cleared. Q100 and IC100 shorted. R118, R119, R124&R125 opened. |
| Open circuit of R606 | 60.4Vpk. 52V tried to restart 3X before latching off. Unit recovered to normal operation with fault removed and manual reset. |

**Supplementary information:**

| 2.5 | TABLE: Limited power sources | N/A |
|---|---|---|

Circuit output tested:

Note: Measured Uoc (V) with all load circuits disconnected:

| Components | Sample No. | Uoc (V) | $I_{sc}$ (A) | | VA | |
|---|---|---|---|---|---|---|
| | | | Meas. | Limit | Meas. | Limit |
| | | | | | | |
| | | | | | | |

**Supplementary information:**

Sc=Short circuit, Oc=Open circuit

| 2.10.2 | Table: working voltage measurement | | | P |
|---|---|---|---|---|
| Location | RMS voltage (V) | Peak voltage (V) | Comments | |
| **CP2000AC54PE (represents all models except Model CP2725)** | | | | |
| Primary to Chassis | 340.5 | 474 | Meet creepage and clearance listed in table “2.10.3 and 2.10.4”; Passed Dielectric strength test 1500Vac; | |
| Primary to Secondary | 340.5 | 474 | Meet creepage and clearance listed in table “2.10.3 and 2.10.4”; Passed Dielectric strength test 4242Vdc; | |
| **For Model CP2725 series** | | | | |
| Primary to Chassis | 363.4 | 481 | Meet creepage and clearance listed in table “2.10.3 and 2.10.4”; Passed Dielectric strength test 1500Vac; | |
| Primary to Secondary | 363.4 | 481 | Meet creepage and clearance listed in table “2.10.3 and 2.10.4”; Passed Dielectric strength test 4242Vdc; | |
| **Supplementary information:** | | | | |

| 2.10.3 and 2.10.4 | TABLE: Clearance and creepage distance measurements | | | | | P |
|---|---|---|---|---|---|---|
| Clearance (cl) and creepage distance (cr) at/of/between: | U peak (V) | U r.m.s. (V) | Required cl (mm) | cl (mm) | Required cr (mm) | cr (mm) |
| **CP2000AC54PE (represents all models except Model CP2725)** | | | | | | |
| **Basic Insulation – Primary Circuitry to Chassis** | | | | | | |
| Primary EMI to Ground | 420 | 240 | 2.3* | 4 | 2.5 | 4 |
| Primary(+dc) circuitry to Ground | 474 | 340.5 | 2.4* | >>2.4 | 3.4 | >>3.4 |
| Primary(-dc) circuitry to Ground | 420 | 240 | 2.3* | 2.5 | 2.5 | 2.5 |
| **Reinforced Insulation – Primary Circuitry to Secondary Circuitry** | | | | | | |
| Primary(+dc) circuitry to SELV | 474 | 340.5 | 4.8* | >>4.8 | 6.8 | >>6.8 |
| Primary(-dc) circuitry to SELV | 420 | 240 | 4.6* | 5.0 | 5.0 | 5.0 |
| All primary circuitry (Inner layer of PCB) to SELV | 474 | 340.5 | 0.4 | 2.5 (Evaluated per cemented joint test) | 0.4 | 2.5 (Evaluated per cemented joint test) |
| **Power Isolating Transformer T301(P/N 3537A)** | | | | | | |
| Primary winding to Core | - | - | 2.7* | 6.35 | 3.3 | 6.35 |
| Secondary winding to Core | - | - | 2.7* | 6.35 | 3.3 | 6.35 |
| Primary winding to secondary winding | 582 | 323.3 | 5.3* | 12.7 | 6.6 | 12.7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Note: Primary/secondary foil winding is wrapped to provide 6.35mm width between primary/secondary windings and floating core. All leadouts are sleeved from inside foil and margin arears. | | | | | | |
| **Bias Isolating Transformer T100 (P/N 3553A)** | | | | | | |
| Primary winding to Core | - | - | 2.8* | 4.0 | 2.8* (2.1mm CTI>600) | 4.0 |
| Secondary winding to Core | - | - | 2.8* | 4.0 | 2.8* (2.1mm CTI>600) | 4.0 |
| Primary winding to Secondary winding | 649 | 409.2 | 5.5* | 8.0 | 5.5 (Clearance > creepage of 4.2mm at 600CTI) | 8.0 |
| Primary winding Pin 1 to Secondary winding Pin 8 | 649 | 409.2 | 5.5* | 8.0 | 4.1mm at CTI=100 for basic insulation; 2.1mm at CTI>600 for supplementary insulation; Total 6.2mm (%) | 8.0 |
| Note: Margin tape 4.0mm width is provided between primary windings and floating core. Margin tape 4.0mm width is provided between secondary windings and floating core. All lead outs are sleeved from inside foil and margin areas. | | | | | | |
| **Supplementary information:**<br>The clearance distance is based on Table 2K, 2L, 2M of the IEC60950-1 for minimum clearances.<br>The creepage distances are based on Table 2N of the IEC60950-1 for minimum creepage distances and Pollution Degree 2 for equipment subjected to long-term stresses.<br>*Evaluated for altitude correction factor of 1.14 for 3000m in accordance with IEC60664-1;<br>% Creepage path from Pin 1 winding touching bobbin to end flange (4mm margin tape) back to Pin 8 (4mm margin tape with CTI of > 600V (3M, 1318 and 44 tape)). Tubing CTI > 600 (Dupont, 6C, 6C-J material). | | | | | | |

| **2.10.3 and 2.10.4** | **TABLE: Clearance and creepage distance measurements** | | | | | P |
|---|---|---|---|---|---|---|
| Clearance (cl) and creepage distance (cr) at/of/between: | U peak (V) | U r.m.s. (V) | Required cl (mm) | cl (mm) | Required cr (mm) | cr (mm) |
| **For model CP2725** | | | | | | |
| **Basic Insulation – Primary Circuitry to Chassis** | | | | | | |
| Primary EMI to Ground | 424 | 300** | 2.4* | 4 | 3.3# | 4 |
| Primary(+dc) circuitry to Ground | 481 | 363.4 | 2.4* | >>2.4 | 3.7 | >>3.7 |
| Primary(-dc) circuitry to Ground | 424 | 300** | 2.4* | 2.5 | 3.3# | 2.5 |
| **Reinforced Insulation – Primary Circuitry to Secondary Circuitry** | | | | | | |
| Primary(+dc) circuitry to SELV | 481 | 363.4 | 4.8* | >>4.8 | 7.4 | >>7.4 |
| Primary(-dc) circuitry to SELV | 424 | 300** | 4.8 * | 5.1 | 6.6# | 6.6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| All primary circuitry (Inner layer of PCB) to SELV | 481 | 340.5 | 0.4 | 2.5 (Evaluated per cemented joint test) | 0.4 | 2.5 (Evaluated per cemented joint test) |
| **Power Isolating Transformer T301(P/N 3537A)** | | | | | | |
| Primary winding to Core | - | - | 2.7* | 6.35 | 3.6 | 6.35 |
| Secondary winding to Core | - | - | 2.7* | 6.35 | 3.6 | 6.35 |
| Primary winding to secondary winding | 585 | 351.6 | 5.3* | 12.7 | 7.2 | 12.7 |
| Note: Primary/secondary foil winding is wrapped to provide 6.35mm width between primary/secondary windings and floating core. All leadouts are sleeved from inside foil and margin arears. | | | | | | |
| **Bias Isolating Transformer T100 (P/N 3553A)** | | | | | | |
| Primary winding to Core | - | - | 2.8* | 4.0 | 2.8* (2.2mm CTI>600) | 4.0 |
| Secondary winding to Core | - | - | 2.8* | 4.0 | 2.8* (2.2mm CTI>600) | 4.0 |
| Primary winding to Secondary winding | 659 | 433.1 | 5.5* | 8.0 | 5.5* (Clearance > creepage of 4.4mm at CTI>600) | 8.0 |
| Primary winding Pin 1 to Secondary winding Pin 8 | 659 | 433.1 | 5.5* | 8.0 | 4.4mm at CTI=100 for BI; 2.2mm at CTI>600 for SI; Total 6mm | 8.0 |
| Note: Margin tape 4.0mm width is provided between primary windings and floating core. Margin tape 4.0mm width is provided between secondary windings and floating core. All lead outs are sleeved from inside foil and margin areas. | | | | | | |

**Supplementary information:**

The clearance distance is based on Table 2K, 2L, 2M of the IEC60950-1 for minimum clearances.

The creepage distances are based on Table 2N of the IEC60950-1 for minimum creepage distances and Pollution Degree 2 for equipment subjected to long-term stresses.

* Evaluated for altitude correction factor of 1.14 for 3000m in accordance with IEC60664-1;
** Based on 300V maximum NOMINAL AC MAINS supply voltage;
# Creepage based upon working voltage measured at 305V worse case input voltage tolerance.
% Creepage path from Pin 1 winding touching bobbin to end flange (4mm margin tape) back to Pin 8 (4mm margin tape with CTI of > 600V (3M, 1318 and 44 tape)). Tubing CTI > 600 (Dupont, 6C, 6C-J material).

| 2.10.5 | TABLE: Distance through insulation measurements | | | | P |
|---|---|---|---|---|---|
| Distance through insulation (DTI) at/of: | U peak (V) | U rms (V) | Test voltage (V) | Required DTI (mm) | DTI (mm) |
| Primary to secondary (between) inner layers of PCB | 624 | 315.7 | 4800Vac | 0.4 (cemented joint test performed) | 0.431 |
| Opto-isolator U600, U601, U602 | 340 | 250 | 4242Vdc | 0.4 | Min 0.4 |
| **Supplementary information:** Reinforced Insulation does not rely on single insulation. | | | | | |

| 4.3.8 | TABLE: Batteries | | | | | | | | N/A |
|---|---|---|---|---|---|---|---|---|---|
| The tests of 4.3.8 are applicable only when appropriate battery data is not available | | | | | | | | | |
| Is it possible to install the battery in a reverse polarity position? | | | | | | | | | |
| | Non-rechargeable batteries | | | Rechargeable batteries | | | | | |
| | Discharging | | Unintentional charging | Charging | | Discharging | | Reversed charging | |
| | Meas. current | Manuf. Specs. | | Meas. current | Manuf. Specs. | Meas. current | Manuf. Specs. | Meas. current | Manuf. Specs. |
| Max. current during normal condition | | | | | | | | | |
| Max. current during fault condition | | | | | | | | | |

| Test results: | | Verdict |
|---|---|---|
| - Chemical leaks | | |
| - Explosion of the battery | | |
| - Emission of flame or expulsion of molten metal | | |
| - Electric strength tests of equipment after completion of tests | | |
| **Supplementary information:** | | |

| 4.3.8 | TABLE: Batteries | N/A |
|---|---|---|
| Battery category..... : | | |
| Manufacturer ..... : | | |
| Type / model..... : | | |
| Voltage ..... : | | |
| Capacity..... : | | |
| Tested and Certified by (incl. Ref. No.) ..... : | | |
| Circuit protection diagram: | | |

| MARKINGS AND INSTRUCTIONS (1.7.13 ) | |
|---|---|
| Location of replaceable battery | N/A |
| Language(s) ……: | N/A |
| Close to the battery ……: | N/A |
| In the servicing instructions ……: | N/A |
| In the operating instructions ……: | N/A |

| 4.5 | TABLE: Thermal requirements (CP1800AC52) | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 85V / 60Hz | 140V / 60Hz | 175V / 60Hz | 275V / 60Hz | — | |
| | Ambient $T_{min}$ (°C) ..... : | 55 | 55 | 55 | 55 | — | |
| | Ambient $T_{max}$ (°C) ..... : | 55 | 55 | 55 | 55 | — | |
| Maximum measured temperature T of part/at:: | | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
| | | Test A | Test B | Test C | Test D | | |
| Ambient | | 55.4 | 54.2 | 55 | 54.7 | - | - |
| L1-Winding | | 102.8 | 79.2 | 88.2 | 77.5 | 130 | |
| L1- Core | | 100.4 | 78.9 | 87.9 | 77.9 | 130 | |
| L2-Winding | | 100.5 | 78.6 | 86.0 | 75.2 | 130 | |
| L2- Core | | 98.7 | 78.3 | 85.4 | 75.6 | 130 | |
| L1-Winding / C1 case | | 98.8 | 78.0 | 86.4 | 76.6 | 130 | |
| L2-Winding / C2 case | | 100.0 | 78.5 | 85.8 | 75.1 | 130 | |
| K200-coil-(inrush, non-isolating) | | 95.5 | 85.1 | 91.3 | 84.9 | 130 | |
| C300 | | 71.0 | 65.7 | 69.3 | 65.9 | 105 | |
| T100-wingding | | 62.5 | 61.8 | 62.4 | 62.1 | 90 | Class A |
| T1-core | | 61.1 | 60.5 | 61.1 | 60.8 | 90 | Class A |
| C151 | | 57.6 | 56.9 | 57.4 | 57.2 | 105 | |
| C152 | | 57.3 | 56.6 | 57.2 | 56.9 | 105 | |
| C156 | | 57.4 | 56.8 | 57.3 | 57.2 | 105 | |
| T300-winding | | 61.2 | 60.4 | 61.6 | 61.1 | 90 | Class A |
| T300-core | | 61.7 | 60.9 | 62.4 | 61.9 | 90 | Class A |
| L300-winding | | 75.4 | 73.5 | 84.1 | 82.9 | 130 | |
| L300-core | | 77.0 | 75.3 | 87.4 | 86.4 | 130 | |
| L200-winding | | 85.6 | 74.1 | 81.2 | 73.0 | 130 | |
| L200-core | | 79.9 | 71.5 | 76.8 | 70.1 | 130 | |
| T301-winding | | 100.3 | 95.0 | 126.3 | 121.7 | 130 | Class F |

| | | | | | | |
|---|---|---|---|---|---|---|
| T301-core | 91.7 | 85.9 | 104.2 | 99.6 | 130 | Class F |
| L400-winding | 97.5 | 90.8 | 118.2 | 114.0 | 130 | |
| L400-core | 91.1 | 84.8 | 106.1 | 102.1 | 130 | |
| L500-winding | 93.0 | 83.7 | 101.7 | 96.4 | 130 | |
| L500-core | 89.3 | 81.2 | 96.9 | 92.2 | 130 | |
| C404 | 86.1 | 78.8 | 91.9 | 87.5 | 105 | |
| C682 | 57.8 | 57.1 | 57.6 | 57.3 | 105 | |
| J1-Vout(+) pin | 82.5 | 77.7 | 91.2 | 88.4 | 105 | |
| J1-Line pin | 91.3 | 77.8 | 88.3 | 81.4 | 105 | |
| HS4/BDA1 | 83.9 | 81.8 | 96.5 | 95.1 | 105 | |

Supplementary information:

Test A – Output1: 47.90V/26.83A, Output2: 3.71V/1.09A;

Test B – Output1: 47.96V/26.83A, Output2: 3.71V/1.09A;

Test C – Output1: 47.88V/37.79A, Output2: 3.71V/1.09A;

Test D – Output1: 47.94V/37.85A, Output2: 3.72V/1.09A;

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| 4.5 | **TABLE: Thermal requirements (CP1800AC52)** | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 85V / 60Hz | 140V / 60Hz | 175V / 60Hz | 275V / 60Hz | — | |
| | Ambient $T_{min}$ (°C) ..... : | 75 | 75 | 75 | 75 | — | |
| | Ambient $T_{max}$ (°C) ..... : | 75 | 75 | 75 | 75 | — | |

| Maximum measured temperature T of part/at:: | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
|---|---|---|---|---|---|---|
| | Test E | Test F | Test G | Test H | | |
| Ambient | 74.1 | 75.4 | 75.5 | 74.6 | - | |
| L1-Winding | 102.3 | 91.4 | 94.2 | 89.2 | 130 | |
| L1- Core | 101.4 | 91.3 | 94.2 | 89.5 | 130 | |
| L2-Winding | 102.0 | 91.1 | 93.4 | 88.2 | 130 | |
| L2- Core | 101.3 | 91.1 | 93.4 | 88.5 | 130 | |
| L1-Winding / C1 case | 100.8 | 90.9 | 93.6 | 89.0 | 130 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| L2-Winding / C2 case | 101.9 | 91.1 | 93.3 | 88.2 | 130 | |
| K200-coil-(inrush, non-isolating) | 105.4 | 99.7 | 101.9 | 98.4 | 130 | |
| C300 | 86.1 | 83.7 | 84.9 | 82.9 | 105 | |
| T100-wingding | 81.8 | 82.4 | 82.5 | 81.8 | 90 | Class A |
| T1-core | 80.3 | 80.8 | 81.0 | 80.3 | 90 | Class A |
| C151 | 77.0 | 77.9 | 78.0 | 77.1 | 105 | |
| C152 | 76.7 | 77.7 | 77.7 | 76.9 | 105 | |
| C156 | 77.2 | 78.0 | 78.1 | 77.2 | 105 | |
| T300-winding | 80.3 | 80.6 | 81.0 | 80.2 | 90 | Class A |
| T300-core | 80.6 | 80.9 | 81.3 | 80.5 | 90 | Class A |
| L300-winding | 87.9 | 87.5 | 91.8 | 90.8 | 130 | |
| L300-core | 88.8 | 88.5 | 93.6 | 92.7 | 130 | |
| L200-winding | 95.8 | 90.4 | 93.0 | 87.6 | 130 | |
| L200-core | 92.4 | 88.9 | 90.9 | 85.9 | 130 | |
| T301-winding | 106.7 | 103.7 | 115.1 | 112.3 | 130 | |
| T301-core | 104.0 | 100.6 | 108.4 | 105.4 | 130 | |
| L400-winding | 101.1 | 97.6 | 106.1 | 103.7 | 130 | |
| L400-core | 98.1 | 94.8 | 101.7 | 99.5 | 130 | |
| L500-winding | 98.8 | 94.0 | 99.9 | 97.1 | 130 | |
| L500-core | 97.1 | 92.8 | 98.1 | 95.5 | 130 | |
| C404 | 96.0 | 92.2 | 96.7 | 94.2 | 105 | |
| C682 | 77.1 | 77.9 | 78.0 | 77.2 | 105 | |
| J1-Vout(+) pin | 93.2 | 91.0 | 95.8 | 94.0 | 105 | |
| J1-Line pin | 97.6 | 91.0 | 94.6 | 91.3 | 105 | |
| HS4/BDA1 | 93.8 | 93.0 | 98.8 | 97.7 | 105 | |

Supplementary information:

Test E – Output1: 51.81V/16.19A, Output2: 3.66V/1.07A;

Test F – Output1: 51.84V/16.20A, Output2: 3.66V/1.07A;

Test G – Output1: 51.68V/22.59A, Output2: 3.65V/1.08A;

Test H – Output1: 51.68V/22.59A, Output2: 3.65V/1.08A;

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| 4.5 | TABLE: Thermal requirements (CP2000) | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 175V/ 60Hz | 275V/ 60Hz | | | — | |
| | Ambient $T_{min}$ (°C) ..... : | 45 | 45 | | | — | |
| | Ambient $T_{max}$ (°C) ..... : | 45 | 45 | | | — | |
| Maximum measured temperature T of part/at:: | | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
| | | Test A | Test B | | | | |
| Ambient | | 45.0 | 44.3 | | | - | - |
| CR200 | | 77.4 | 65.5 | | | 130 | |
| L200-winding | | 66.0 | 57.7 | | | 130 | |
| L200-core | | 65.8 | 57.8 | | | 130 | |
| C300 | | 60.6 | 55.8 | | | 105 | |
| CR203 | | 75.5 | 66.2 | | | 130 | |
| Q204 | | 81.5 | 69.1 | | | 130 | |
| Q203 | | 75.7 | 65.3 | | | 130 | |
| CR301 | | 74.8 | 72.2 | | | 130 | |
| L400-winding | | 116.8 | 111.4 | | | 130 | |
| Q304 | | 65.6 | 64.2 | | | 130 | |
| L400-core | | 97.7 | 92.2 | | | 130 | |
| Q301 | | 65.7 | 64.3 | | | 130 | |
| Q302 | | 66.1 | 64.7 | | | 130 | |
| Q303 | | 66.1 | 64.7 | | | 130 | Class F |
| CR401 | | 101.2 | 99.0 | | | 130 | Class F |
| L300-winding | | 71.9 | 69.9 | | | 130 | |
| T301-in_wind | | 112.5 | 107.2 | | | 130 | |
| T301-core | | 94.7 | 88.1 | | | 130 | |
| L300-core | | 70.6 | 68.7 | | | 130 | |
| CR400 | | 101.9 | 99.5 | | | 130 | |
| Q500 | | 94.9 | 92.5 | | | 130 | |
| L2-winding | | 83.5 | 66.5 | | | 130 | |
| L2-core | | 84.4 | 68.4 | | | 130 | |
| T301-out_wind | | 92.6 | 88.3 | | | 130 | Class F |
| J1-(+)out pin | | 83.6 | 76.3 | | | 105 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| CR204 | 63.0 | 57.0 | | | 130 | |
| C206 | 51.0 | 49.0 | | | 105 | |
| C207 | 55.3 | 52.4 | | | 105 | |
| R454-shunt | 107.2 | 103.3 | | | 130 | |
| T100-winding | 55.8 | 54.9 | | | 90 | Class A |
| T100-core | 51.0 | 50.1 | | | 90 | Class A |
| L1-winding | 86.4 | 68.9 | | | 130 | |
| L1-core | 88.9 | 72.0 | | | 130 | |
| L500-core | 93.0 | 88.3 | | | 130 | |
| L500-winding | 102.6 | 97.9 | | | 130 | |
| K200-coil | 71.0 | 61.9 | | | 105 | |
| C404 | 82.2 | 77.2 | | | 105 | |
| HS4/BDA1 | 75.9 | 74.1 | | | 130 | |
| CR201 | 78.0 | 66.1 | | | 130 | |

Supplementary information:

Test A – Output1: 51.74V/39.28A, Output2: 4.79V/0.74A;

Test B – Output1: 51.75V/39.27A, Output2: 4.79V/0.74A;

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| **4.5** | **TABLE: Thermal requirements (CP1400AC52)** | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 90V/ 60Hz | 285V/ 60Hz | | | — | |
| | Ambient $T_{min}$ (°C) ..... : | 50 | 55 | | | — | |
| | Ambient $T_{max}$ (°C) ..... : | 50 | 55 | | | — | |

| Maximum measured temperature T of part/at:: | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
|---|---|---|---|---|---|---|
| | Test A | Test B | | | | |
| Ambient | 50.1 | 54.6 | | - | | - |
| L1-core | 115.8 | 68.4 | | 130 | | |
| L1-winding | 110.1 | 67.4 | | 130 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| L2-core | 100.5 | 66.8 | | 130 | | |
| L2-winding | 105.5 | 67.4 | | 130 | | |
| K200-coil | 102.8 | 67.0 | | 105 | | |
| L400-winding | 98.5 | 86.8 | | 130 | | |
| Q500 | 81.1 | 76.4 | | 130 | | |
| CR400 | 91.8 | 90.7 | | 130 | | |
| CR401 | 84.0 | 83.0 | | 130 | | |
| T301-core | 97.6 | 90.6 | | 130 | | Class F |
| T301-winding,inside | 101.4 | 93.0 | | 130 | | Class F |
| T301-winding,outside | 91.7 | 77.5 | | 130 | | Class F |
| CR200 | 98.8 | 69.0 | | 130 | | |
| CR201 | 96.8 | 68.4 | | 130 | | |
| L200-core | 79.3 | 64.2 | | 130 | | |
| L200-winding | 83.9 | 63.9 | | 130 | | |
| C300 | 64.6 | 59.5 | | 105 | | |
| C206 | 54.8 | 56.9 | | 105 | | |
| C207 | 59.9 | 58.9 | | 105 | | |
| CR203 | 99.8 | 72.1 | | 130 | | |
| CR204 | 85.4 | 66.2 | | 130 | | |
| Q203 | 96.4 | 70.6 | | 130 | | |
| Q204 | 95.2 | 69.7 | | 130 | | |
| L300-core | 70.7 | 69.4 | | 130 | | |
| L300-winding | 70.1 | 69.0 | | 130 | | |
| Q301 | 63.8 | 66.8 | | 130 | | |
| Q303 | 64.9 | 66.3 | | 130 | | |
| Q304 | N/A | 65.5 | | 130 | | |
| T100-core | 58.7 | 60.6 | | 90 | | |
| T100-winding | 59.7 | 59.2 | | 90 | | |
| CR301 | 74.4 | 73.6 | | 130 | | |
| C312 | 69.7 | 68.0 | | 105 | | |
| J1-Vo(+) | N/A | 78.7 | | 105 | | |

Supplementary information:

1) Test A – Output1: 51.88V/27.01A, Output2: 4.54V/0.70A;

Test B – Output1: 51.88 V/27.00A, Output2: 4.55V/0.66A;

2) The subject equipment is intended for 50 ºC ambient. The power supply was tested at 55ºC but rating de-rated to 50 ºC due to lack of thermal margin.

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| 4.5 | TABLE: Thermal requirements (CP2100AC54) | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 175V/ 60Hz | 275V/ 60Hz | 175V/ 60Hz | | — | |
| | Ambient $T_{min}$ (°C) ..... : | 45 | 45 | 45 | | — | |
| | Ambient $T_{max}$ (°C) ..... : | 45 | 45 | 45 | | — | |

| Maximum measured temperature T of part/at:: | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
|---|---|---|---|---|---|---|
| | Test A | Test B | Test C | | | |
| Ambient | 45.2 | 45.1 | 45.3 | | -- | - |
| CR201 | 62.4 | 57.0 | 62.6 | | 125 | |
| CR200 | 63.6 | 57.7 | 63.8 | | 125 | |
| L200 Winding | 64.6 | 57.1 | 64.9 | | 130 | |
| L200 Core | 60.4 | 54.8 | 60.7 | | 130 | |
| C300 | 53.2 | 51.1 | 53.4 | | 105 | |
| CR203 | 70.0 | 63.0 | 70.2 | | 125 | |
| Q204 | 62.7 | 57.6 | 62.8 | | 115 | |
| Q203 | 63.4 | 58.1 | 63.5 | | 115 | |
| CR301 | 59.2 | 58.4 | 59.8 | | 125 | Class A |
| L400 Winding | 75.9 | 73.1 | 78.3 | | 130 | Class A |
| Q304 | 56.5 | 56.2 | 57.4 | | 125 | |
| Q301 | 58.2 | 57.8 | 59.2 | | 115 | |
| Q303 | 56.8 | 56.5 | 57.7 | | 115 | |
| CR401 | 72.8 | 71.9 | 74.6 | | 125 | Class A |
| L300 Winding | 57.8 | 57.4 | 58.7 | | 130 | Class A |
| T301 Winding in | 91.0 | 87.8 | 93.9 | | 130 | Class F |
| T301 Core | 73.6 | 70.4 | 74.5 | | 130 | Class F |
| L300 Core | 60.8 | 59.9 | 61.7 | | 130 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| CR400 | 73.9 | 73.0 | 75.8 | | 125 | |
| Q500 | 71.4 | 70.3 | 73.1 | | 115 | |
| L2 Winding | 72.1 | 60.6 | 72.2 | | 130 | |
| L2 Core | 70.0 | 60.3 | 70.3 | | 130 | |
| T301 Winding outside | 93.7 | 91.2 | 96.9 | | 130 | Class F |
| J1 Output Blade | 72.3 | 71.3 | 74.3 | | 90 | |
| CR204 | 64.4 | 58.7 | 64.5 | | 125 | |
| C206 | 48.6 | 47.8 | 48.7 | | 105 | |
| C207 | 50.4 | 49.0 | 50.6 | | 105 | |
| C312 | 60.4 | 58.8 | 61.0 | | 105 | |
| T100 Winding | 54.2 | 54.0 | 54.3 | | 90 | Class A |
| L400 Core | 78.9 | 76.5 | 81.8 | | 130 | |
| T100 Core | 49.3 | 49.1 | 49.4 | | 90 | Class A |
| Q302 | 57.3 | 57.0 | 58.3 | | 115 | |
| L1 Winding | 72.0 | 61.3 | 72.4 | | 130 | |
| L1 Core | 70.3 | 60.9 | 70.6 | | 130 | |
| R454 | 83.9 | 82.1 | 86.8 | | 130 | |
| L500 Core | 72.7 | 70.3 | 74.8 | | 130 | |
| L500 Winding | 75.4 | 74.1 | 77.9 | | 130 | |
| K200 Coil | 74.5 | 69.6 | 74.9 | | 105 | |
| C404 | 68.5 | 66.0 | 70.1 | | 105 | |
| HS4 / BDA1 | 76.4 | 75.7 | 78.8 | | 130 | |

Supplementary information:

1) Test A – Output: 57.68V/36.63A/2112W;
   Test B – Output: 57.68V/36.70/2117W;
   Test C – Output: 54.31V/38.70A/2102W;
2) Test Duration: A:3hrs,B:1hr,C:1.5hrs.
3) The subject equipment is intended for 55°C ambient
4) Heating test performed at worse than +6% and -10% tolerance.

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Supplementary information: | | | | | | | |

| 4.5 | TABLE: Thermal requirements (CP2100AC54) | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 175V/ 60Hz | 275V/ 60Hz | 175V/ 60Hz | | — | |
| | Ambient $T_{min}$ (°C) ..... : | 55 | 55 | 55 | | — | |
| | Ambient $T_{max}$ (°C) ..... : | 55 | 55 | 55 | | — | |
| Maximum measured temperature T of part/at:: | | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
| | | Test D | Test E | Test F | | | |
| Ambient | | 55.0 | 55.0 | 55.1 | | -- | - |
| CR201 | | 72.1 | 66.6 | 71.7 | | 125 | |
| CR200 | | 73.2 | 67.2 | 72.8 | | 125 | |
| L200 Winding | | 74.5 | 66.9 | 74.1 | | 130 | |
| L200 Core | | 70.5 | 64.8 | 70.2 | | 130 | |
| C300 | | 62.9 | 60.9 | 62.8 | | 105 | |
| CR203 | | 79.8 | 72.6 | 79.0 | | 125 | |
| Q204 | | 72.6 | 67.3 | 72.2 | | 115 | |
| Q203 | | 73.4 | 67.9 | 73.0 | | 115 | |
| CR301 | | 69.6 | 68.8 | 69.8 | | 125 | Class A |
| L400 Winding | | 88.6 | 85.4 | 88.9 | | 130 | Class A |
| Q304 | | 67.4 | 67.2 | 67.7 | | 125 | |
| Q301 | | 69.5 | 68.9 | 69.7 | | 115 | |
| Q303 | | 67.9 | 67.5 | 68.1 | | 115 | |
| CR401 | | 84.0 | 82.9 | 84.3 | | 125 | Class A |
| L300 Winding | | 68.4 | 67.9 | 68.7 | | 130 | Class A |
| T301 Winding in | | 103.7 | 100.1 | 103.9 | | 130 | Class F |
| T301 Core | | 85.0 | 81.1 | 84.6 | | 130 | Class F |
| L300 Core | | 71.4 | 70.5 | 71.7 | | 130 | |
| CR400 | | 85.0 | 84.0 | 85.4 | | 125 | |
| Q500 | | 82.8 | 81.5 | 83.1 | | 115 | |
| L2 Winding | | 82.2 | 70.4 | 81.3 | | 130 | |
| L2 Core | | 80.1 | 70.2 | 79.4 | | 130 | |
| T301 Winding outside | | 107.2 | 104.1 | 107.4 | | 130 | Class F |

| | | | | | | |
|---|---|---|---|---|---|---|
| J1 Output Blade | 84.2 | 82.8 | 84.6 | | 90 | |
| CR204 | 74.4 | 68.4 | 73.9 | | 125 | |
| C206 | 58.4 | 57.6 | 58.4 | | 105 | |
| C207 | 60.1 | 58.8 | 60.1 | | 105 | |
| C312 | 70.6 | 69.0 | 70.7 | | 105 | |
| T100 Winding | 64.0 | 63.8 | 64.1 | | 90 | Class A |
| L400 Core | 92.1 | 89.1 | 92.6 | | 130 | |
| T100 Core | 59.2 | 59.0 | 59.3 | | 90 | Class A |
| Q302 | 68.7 | 68.1 | 68.8 | | 115 | |
| L1 Winding | 82.2 | 71.2 | 81.4 | | 130 | |
| L1 Core | 80.4 | 70.8 | 79.8 | | 130 | |
| R454 | 96.8 | 94.3 | 97.3 | | 130 | |
| L500 Core | 84.8 | 82.0 | 85.0 | | 130 | |
| L500 Winding | 87.7 | 86.1 | 88.3 | | 130 | |
| K200 Coil | 84.2 | 79.2 | 83.9 | | 105 | |
| C404 | 80.7 | 77.8 | 80.8 | | 105 | |
| HS4 / BDA1 | 88.3 | 87.3 | 88.8 | | 130 | |

Supplementary information:

1) Test D – Output: 54.29V/37.67A/2045W;
   Test E – Output: 54.30V/37.70/2046W;
   Test F – Output: 52.26V/38.31A/2002W;
2) Test Duration: D:3hrs,E:1.5hrs,F:1.5hrs.
3) The subject equipment is intended for 55°C ambient
4) Heating test performed at worse than +6% and -10% tolerance.

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| 4.5 | TABLE: Thermal requirements (CP2000AC54SD) | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 175V/ 60Hz | 275V/ 60Hz | 175V/ 60Hz | 275V/ 60Hz | — | |
| | Ambient $T_{min}$ (°C) ..... : | 55 | 55 | 70 | 70 | — | |
| | Ambient $T_{max}$ (°C) ..... : | 55 | 55 | 70 | 70 | — | |
| Maximum measured temperature T of part/at:: | | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
| | | Test A | Test B | Test C | Test D | | |
| Ambient | | 54.7 | 54.9 | 70.3 | 70.0 | - | - |
| C404 | | 81.5 | 75.0 | 87.1 | 84.1 | 105 | |
| C156 | | 57.7 | 57.7 | 73.2 | 72.9 | 105 | |
| C152 | | 57.3 | 57.4 | 72.8 | 72.5 | 105 | |
| C151 | | 57.5 | 57.6 | 73.0 | 72.6 | 105 | |
| C300 | | 63.7 | 60.9 | 76.1 | 74.6 | 105 | |
| C682 | | 57.8 | 57.8 | 73.2 | 72.8 | 105 | |
| K200-coil | | 81.1 | 70.4 | 87.2 | 81.6 | 105 | |
| L1-w / C1 | | 86.0 | 73.7 | 88.8 | 83.0 | 105 | |
| L1-w / c | | 88.2 | 73.5 | 89.9 | 82.6 | 130 | |
| L2-w / c | | 86.5 | 72.5 | 89.1 | 82.3 | 130 | |
| L400-w / c | | 99.5 | 93.1 | 95.9 | 93.1 | 130 | |
| T300-winding | | 60.4 | 60.1 | 75.4 | 74.8 | 130 | |
| L300-w / c | | 80.2 | 76.3 | 85.9 | 84.0 | 130 | |
| L500-w / c | | 94.0 | 87.7 | 93.4 | 90.6 | 130 | |
| T301-winding | | 109.4 | 103.8 | 102.6 | 100.1 | 130 | Class F |
| T301-core | | 85.9 | 79.7 | 91.8 | 89.4 | 130 | Class F |
| T100-winding | | 62.1 | 62.0 | 77.1 | 76.7 | 90 | Class A |
| T100-core | | 60.8 | 60.6 | 75.9 | 75.6 | 90 | Class A |
| J1-Vin(L),PWB / conn. | | 85.1 | 73.4 | 88.0 | 82.5 | 105 | |
| J1-Vout (+), PWB / conn. | | 89.5 | 86.1 | 91.9 | 90.4 | 105 | |
| IC1-body | | 90.0 | 81.7 | 91.5 | 87.8 | 100 | |

Supplementary information:

Test A – Output1: 51.97V/38.55A/2003.39W, Output2: 5.30V/0.74A/3.94W;

Test B –Output1: 51.97V/38.55A/2003.77W, Output2: 5.30V/0.75A/3.97W;

Test C –Output1: 53.82V/26.08A/1404W, Output2: 5.29V/0.75A/1408W;

Test D –Output1: 53.83V/26.04A/1402W, Output2: 5.29V/0.75A/1406W;

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Supplementary information: | | | | | | | |

| 4.5 | TABLE: Thermal requirements (CP2725AC54) | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 85V/ 60Hz | 140V/ 60Hz | 175V/ 60Hz | 275V/ 60Hz | — | |
| | Ambient $T_{min}$ (°C) ..... : | 55 | 55 | 55 | 55 | — | |
| | Ambient $T_{max}$ (°C) ..... : | 55 | 55 | 55 | 55 | — | |
| Maximum measured temperature T of part/at:: | | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
| | | Test A | Test B | Test C | Test D | | |
| Ambient | | 54.9 | 55.1 | 55.1 | 55.0 | - | - |
| L1- w / c | | 89.7 | 72.8 | 95.9 | 78.6 | 130 | |
| L2- w / c | | 92.7 | 74.2 | 97.7 | 78.7 | 130 | |
| L1 / w / C1 | | 84.4 | 71.9 | 92.3 | 79.7 | 105 | |
| L2 / w / C2 | | 82.3 | 70.6 | 87.2 | 75.4 | 105 | |
| K200-coil | | 82.5 | 71.7 | 86.1 | 74.9 | 105 | |
| C300 | | 62.1 | 60.5 | 64.4 | 62.1 | 105 | |
| T100-winding | | 60.7 | 60.9 | 61.2 | 60.9 | 90 | Class A |
| T100-core | | 60.9 | 61.1 | 61.7 | 61.3 | 90 | Class A |
| C151 | | 58.2 | 58.4 | 58.6 | 58.4 | 105 | |
| C152 | | 57.6 | 57.9 | 58.0 | 57.8 | 105 | |
| C156 | | 58.1 | 58.2 | 58.4 | 58.2 | 105 | |
| T300- w / c | | 60.4 | 60.5 | 62.0 | 61.6 | 130 | Non-isolating |
| L300- w / c | | 65.9 | 65.5 | 84.9 | 83.9 | 130 | |
| L200- w / c | | 73.4 | 67.0 | 79.0 | 69.5 | 130 | |
| T301-winding | | 82.8 | 80.4 | 116.6 | 113.8 | 130 | Class F |
| T301-core | | 74.2 | 73.3 | 87.0 | 85.4 | 130 | Class F |
| L400-w/ c | | 77.3 | 72.9 | 99.0 | 94.0 | 130 | |
| C404 | | 72.3 | 68.3 | 82.3 | 77.2 | 105 | |
| J1-Vo(+) pin | | 76.2 | 72.5 | 95.4 | 91.0 | 100 | |
| J1-Line pin | | 83.0 | 72.1 | 92.7 | 81.4 | 100 | |
| HSA4-HS / BDA1 | | 75.6 | 75.0 | 94.7 | 93.8 | 105 | |
| IC1-body | | 71.3 | 67.1 | 78.0 | 73.1 | 110 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| T301-embedded pt.1 | 78.7 | 76.9 | 105.3 | 102.9 | 140 | Class F |
| T301-embedded pt.2 | 79.1 | 76.9 | 106.2 | 103.4 | 140 | Class F |
| T301-embedded pt.3 | 78.6 | 76.6 | 106.5 | 104.0 | 140 | Class F |
| T301-embedded pt.4 | 75.7 | 73.6 | 97.5 | 94.7 | 140 | Class F |

Supplementary information:

1) Test A – Output: 53.95V/22.23A/1199W;
Test B –Output: 53.95V/22.23A/1199W;
Test C –Output: 53.82V/50.41A/2713W;
Test D –Output: 53.82V/50.67A/2727W;
2) The subject equipment is intended for 55°C ambient / 75°C with derating.
3) Heating test performed at worse than +6% and -10% tolerance.

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| **4.5** | **TABLE: Thermal requirements (CP2725AC54)** | | | | | | P |
|---|---|---|---|---|---|---|---|
| | Supply voltage (V) ..... : | 85V/ 60Hz | 175V/ 60Hz | | | — | |
| | Ambient $T_{min}$ (°C) ..... : | 75 | 75 | | | — | |
| | Ambient $T_{max}$ (°C) ..... : | 75 | 75 | | | — | |

| Maximum measured temperature T of part/at:: | T (°C) | | | | Allowed $T_{max}$ (°C) | Insulation Class / Max Rated Temp. |
|---|---|---|---|---|---|---|
| | Test E | Test F | | | | |
| Ambient | 74.8 | 75.5 | | | - | - |
| L1- w / c | 87.8 | 97.1 | | | 130 | |
| L2- w / c | 88.9 | 97.9 | | | 130 | |
| L1 / w / C1 | 87.2 | 96.4 | | | 105 | |
| L2 / w / C2 | 86.8 | 94.0 | | | 105 | |
| K200-coil | 88.5 | 94.5 | | | 105 | |
| C300 | 79.7 | 81.6 | | | 105 | |
| T100-winding | 80.5 | 81.3 | | | 90 | Class A |
| T100-core | 80.3 | 81.2 | | | 90 | Class A |
| C151 | 78.1 | 78.8 | | | 105 | |
| C152 | 77.6 | 78.3 | | | 105 | |
| C156 | 78.0 | 78.7 | | | 105 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| T300- w / c | 79.6 | 81.1 | | | 130 | Non-isolating |
| L300- w / c | 80.7 | 91.9 | | | 130 | |
| L200- w / c | 84.5 | 90.7 | | | 130 | |
| T301-winding | 93.2 | 111.6 | | | 130 | Class F |
| T301-core | 89.6 | 97.5 | | | 130 | Class F |
| L400-w/ c | 87.4 | 99.9 | | | 130 | |
| C404 | 84.9 | 92.3 | | | 105 | |
| J1-Vo(+) pin | 86.7 | 98.8 | | | 100 | |
| J1-Line pin | 87.0 | 96.9 | | | 100 | |
| HSA4-HS / BDA1 | 87.3 | 100.4 | | | 105 | |
| IC1-body | 84.6 | 90.2 | | | 110 | |
| T301-embedded pt.1 | 90.8 | 105.6 | | | 140 | Class F |
| T301-embedded pt.2 | 90.8 | 105.8 | | | 140 | Class F |
| T301-embedded pt.3 | 90.2 | 105.3 | | | 140 | Class F |
| T301-embedded pt.4 | 88.2 | 100.4 | | | 140 | Class F |

Supplementary information:

1) Test E – Output: 53.95V/9.12A/492W;
Test F –Output: 53.81V/30.33A/1632W.

2) The subject equipment is intended for 55°C ambient / 75°C with derating.

3) Heating test performed at worse than +6% and -10% tolerance.

| Temperature T of winding: | $t_1$ (°C) | $R_1$ (Ω) | $t_2$ (°C) | $R_2$ (Ω) | T (°C) | Allowed $T_{max}$ (°C) | Insulation class |
|---|---|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Supplementary information:

| 4.5.5 | TABLE: Ball pressure test of thermoplastic parts | | P |
|---|---|---|---|
| | Allowed impression diameter (mm) .....: | ≤ 2 mm | — |

| Part | Test temperature (°C) | Impression diameter (mm) |
|---|---|---|
| | | |
| | | |

**Supplementary information:**

*Note: The transformer bobbins and input connector were used within their temperature and flammability rating. Other plastic parts are used within their UL recognized RTI rating. Furthermore, performed fault testing for applicable primary and secondary components with no excessive temperatures.

| 4.7 | TABLE: Resistance to fire | | | | P |
|---|---|---|---|---|---|
| Part | Manufacturer of material | Type of material | Thickness (mm) | Flammability class | Evidence |
| | N/A | N/A | N/A | N/A | N/A |
| | | | | | |

**Supplementary information:**

**note: All materials are used in within their UL recognized electrical and temperature RTI rating. Materials rated minimum V-2. Furthermore, performed fault testing for applicable primary and secondary components with no excessive temperature.

| 5.1 | TABLE: touch current measurement | | P |
|---|---|---|---|
| Measured between: | Measured (mA) | Limit (mA) | Comments/conditions |
| **For all models except CP2725 series** | | | |
| For TN, TT power systems | | | |
| Line to chassis | 1.75mA | 3.5mA | normal |
| Neutral to chassis | 1.75mA | 3.5mA | normal |
| Line to chassis | 1.75mA | 3.5mA | reverse |
| Neutral to chassis | 1.75mA | 3.5mA | reverse |
| For IT power system | | | |
| Line to chassis | 3.0mA | 3.5mA | normal |
| Neutral to chassis | 3.0mA | 3.5mA | normal |
| Line to chassis | 3.0mA | 3.5mA | reverse |
| Neutral to chassis | 3.0mA | 3.5mA | reverse |
| **Model CP2725 series** | | | |
| For TN, TT power systems | | | |
| Line to chassis | 1.925mA | 3.5mA | normal |
| Neutral to chassis | 1.900mA | 3.5mA | normal |
| Line to chassis | 1.900mA | 3.5mA | reverse |
| Neutral to chassis | 1.925mA | 3.5mA | reverse |
| For IT power system | | | |
| Line to chassis | 2.90mA | 3.5mA | normal |
| Neutral to chassis | 2.90mA | 3.5mA | normal |
| Line to chassis | 2.90mA | 3.5mA | reverse |
| Neutral to chassis | 2.90mA | 3.5mA | reverse |
| **Supplementary information:** | | | |

| 5.2 | TABLE: Electric strength tests, impulse tests and voltage surge tests | | P |
|---|---|---|---|
| Test voltage applied between: | Voltage shape (AC, DC, impulse, surge) | Test voltage (V) | Breakdown Yes / No |
| **On complete system** | | | |
| Primary to earthed chassis (basic) | DC | 3000 | No |
| Primary to SELV secondary (reinforced) | DC | 4242 | No |
| **On Safety Isolating Transformer T301** | | | |
| Primary and SELV Secondary | AC | 3000 | No |
| Primary and core | AC | 3000 | No |
| Secondary and core | AC | 3000 | No |
| **On Safety Isolating Transformer T100** | | | |
| Primary and SELV Secondary | AC | 3000 | No |
| Primary and core | AC | 3000 | No |
| Secondary and core | AC | 3000 | No |
| **One layer of 3M #13/8 tape** | AC | 3000 | No |

**Supplementary information:**

- The spacing and insulation were such as to withstand the applied potential for a period of one minute without flashover or breakdown.
- The spark gap, SG1, was removed for this test.

Equipment settings: Cutoff Current - 10 mA; Scale – 5KV.

| 5.3 | TABLE: Fault condition tests (CP1800AC52) | | P |
|---|---|---|---|
| | Ambient temperature (°C) .....: | 21. | — |
| | Power source for EUT: Manufacturer, model/type, output rating .....: | See equipment list | — |

| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
|---|---|---|---|---|---|---|
| 52 V Output | Overload | 254 V 60 Hz | 5.0 hrs | F1 / F2 / F100 | 8.01A | T301: 56.3°C, Vout : 50.93 V, Iout : 36.2 A, VAmax : 1843.7 W, remaining output: 5 V / 1 A |
| 5 V Output | Overload | 254 V 60 Hz | 6.0 hrs | F1 / F2 / F100 | 7.83A | T100: 39.8°C, Vout : 3.130 V, Iout : 2.81 A, VAmax : 8.80 W, remaining output: 52 V / 34.6 A |
| 52 V Output | Short Vo(+) to Vo(-) | 254 V 60 Hz | 3.8 hrs | F1 / F2 / F100 | 0.46A | T301: 37.1°C, Ishort : 688 Apk. < 200 mSec. 52 V output went into hiccup mode Instantly went fault was induced. 5 V output continued to operate without Interruption. Unit recovered to normal operation with fault removed and auto reset. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 V Output | Short Vo(+) to Vo(-) | 254 V 60 Hz | 30 min | F1 / F2 / F100 | 7.68A | T100: 32.0°C, Ishort : 3.30 Apk. About 1 second after the initial fault was induced, 5 V output dropped to 0.02 V / 0.97A and continued for the duration of test. 52 V output continued to operate without interruption. Unit recovered to normal operation with fault removed and auto reset. |
| K200, p. 8, | Open | 254 V 60 Hz | Instant | F1 / F2 / F100 | 0.00A | All outputs turned off instantly when fault was induced. Unit recovered to normal operation with fault removed, a cool down of 1 minute and manual reset. Test performed 3X with same results. Test performed with a 60A branch circuit |
| CR200, "~" to "+", | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F1 & F2 cleared. No smoke or smell. Test performed using a 60A branch. |
| CR204, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | 0.00A | CR204 shorted. Test Performed 3X with same results. No smoke or smell. Test performed with a 60A branch circuit |
| CR203, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F1 & F2 cleared. No smoke or smell. Test performed with a 60A branch circuit |
| L200, | Short | 254 V 60 Hz | 30 min | F1 / F2 / F100 | 7.27A, hiccup mode | Damaged. 52 V output, only, when into hiccup mode instantly when fault was induced. Test Performed 3X with same results. No smoke or smell. Test performed with a 60A branch circuit |
| Q203, D to S, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F1 & F2 cleared. IC980 & IC981 shorted. No smoke or smell. |
| Q203, D to G, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F1 & F2 cleared. Q203 & Q204 shorted. No smoke or smell. |
| C311, | Short | 254 V 60 Hz | 30 min | F1 / F2 / F100 | 7.86A | T301: 49.8°C. Unit continued to operate without interruption or apparent damage. No smoke or smell. |
| Q301, D to S, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | 2 X - 52 V output, only turned off instantly when fault was induced. Unit recovered to normal operation with fault removed and auto reset. 1 X - F2 cleared. CR204, Q301, & IC602 shorted. IC300 damaged. Test Performed 3X. No smoke or smell. Test performed with a 60A branch circuit |
| Q301, D to G, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | 0.44A | Q301, Q305, CR302, IC953, & IC960 shorted. R303 opened. IC300 damaged. 52 V output, only turned off when fault was induced. Test Performed 3X with same results. No smoke or smell. Test performed with a 60A branch circuit |
| Q304, D to S, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F1 cleared. CR203, CR305, Q303, & Q307 shorted. R305 opened. No smoke or smell. Test performed with a 60A branch circuit |
| Q304, D to G, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | 0.00A | Both outputs turned off instantly when fault was induced. Unit recovered to normal operation with fault removed and manual reset. Test Performed 3X with same results. No smoke or smell. Test performed with a 60A branch circuit |
| C319, | Short | 254 V 60 Hz | 20 min | F1 / F2 / F100 | 7.43A | T301: 49.3°C. Unit continued to operate without interruption or apparent damage. No smoke or smell. |

| | | | | | | |
|---|---|---|---|---|---|---|
| CR400, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | 0.46A | 52 V output turned off instantly when fault was induced. Unit recovered to normal operation with fault removed and auto reset. Test Performed 3X with same results. No smoke or smell. |
| Q100, D to S, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F100 cleared. Q100 shorted. IC100 damaged. R118, R119, R124, & R125 opened. No smoke, but had smell. Test performed with a 60A branch circuit |
| Q100, D to G, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F100 cleared. Q100 & IC100 shorted. R118, R119, R124, & R125 opened. No smoke, but had smell. Passed hi-pot test. Test performed with a 60A branch circuit |
| C300, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F1 & F2 cleared. CR203 shorted. K200 damaged. No smoke or smell. |
| Q101, C to E, | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | * | F2 cleared. IC602 shorted. No smoke or smell. Test performed with a 60A branch circuit |
| Fan 2, | Stopped | 254 V 60 Hz | 20 min | F1 / F2 / F100 | 0.43A | T301: 30.5°C, T100: 39.4°C. 52V only output turned off 3 sec. after fan was stopped. Fan was pulsating continually throughout test. Unit recovered to normal operation with fault removed and auto reset. No smoke or smell. |
| Fans, | Blocked | 254 V 60 Hz | 4 hrs | F1 / F2 / F100 | 0.42A, hiccup mode | T301: 79.5°C, T100: 98.5°C. 52V went into hiccup mode, 117 seconds after fault was induced and continued for 133 sec. At 250 sec. into the test, 52V output turned off for 40 sec. due to thermal shutdown. Unit recovered to normal operation after the 40 sec. cool down and auto reset. This cycle continued throughout the test. Another observation to the performance of the UUT was that as the internal temperature of the unit increased, the 52V output folded back due to thermal dreading. No smoke or smell. |
| **Supplementary information:** *Whenever the abnormal test caused fuses F1, F2, and / or F100 to open, the fuse bodies were intact. Test performed with a 60A branch circuit | | | | | | |

| **5.3** | **TABLE: Fault condition tests (CP2000)** | | P |
|---|---|---|---|
| | Ambient temperature (°C) ..... : | 21. | — |
| | Power source for EUT: Manufacturer, model/type, output rating ..... : | See equipment list | — |

| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
|---|---|---|---|---|---|---|
| 52 V output | Overload | 254 V 60 Hz | 4 hrs | F1 / F2 / F100 | 8.76A | T301: 51.41°C, Vout : 51.67 V, Iout : 39.0 A, VAmax : 2016.7 W, remaining outputs: 5 V / 0.79 A |
| 5 V output | Overload | 254 V 60 Hz | 4 hrs | F1 / F2 / F100 | 5.66A | T100: 29.7°C, Vout : 4.71 V, Iout : 1.20 A, VAmax : 5.66 W, remaining outputs: 52 V / 38.7 A |
| 52 V output | Short Vo(+) to Vo(-) | 254 V 60 Hz | 2 hrs | F1 / F2 / F100 | 0.50A | T301:55.6°C, Ishort : 1303 Apk. < 200 mSec. 52 V output went into a 35-sec hiccup mode instantly when fault was induced. 5 V output continued to operate without interruption. Unit recovered to normal operation with fault removed and auto reset. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 V output | Short Vo(+) to Vo(-) | 254 V 60 Hz | 1 hrs | F1 / F2 / F100 | 8.62A | T100:27.6°C, Ishort : 1.924 Apk. About 1second after the initial fault was induced, 5 V output dropped 0.02 V / 0.97A and continued for the duration of test. 52 V output continued to operate without interruption. Unit recovered to normal operation with fault removed and auto reset. |
| Fan | Blocked | 254 V 60 Hz | 2.5 hrs | F1 / F2 / F100 | 8.71A | T301: 83.6°C. T100: 46.23°C. 52 V output, only, shut down after 2.5min Unit recovered to normal operation after a cool down of around 1.5min. and auto reset. This cycle continued throughout test. Passed Hi-pot test. |
| **Supplementary information:** | | | | | | |

| **5.3** | **TABLE: Fault condition tests (CP1400AC52)** | | P |
|---|---|---|---|
| | Ambient temperature (°C) .....: | 22. | — |
| | Power source for EUT: Manufacturer, model/type, output rating .....: | See equipment list | — |

| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
|---|---|---|---|---|---|---|
| 52 V output | Overload | 100V, 60Hz | 4 hrs | F1 / F2 | 19.59A | T301:78°C, Vout : 51.8 V, Iout : 30.0 A, VAmax : 1554.0 W, remaining outputs:5 V / 0.67 A / 3.35 W |
| 52 V output | Short Vo(+) to Vo(-) | 90V, 60Hz | 5 hrs | F1 / F2 | 0.00A | T301:82°C, Ishort : 403 Apk. 52 V output went into a slow hiccup mode, instantly, when fault was induced, maintaining 30 A out. 5 V output continued to operated normally throughout testing. Unit recovered to normal operation with fault removed and auto reset. |
| CR200, "~" to "+" | Short | 288V, 60Hz | Instant | F1 / F2 | * | F1 & F2 cleared |
| CR203 | Short | 288V, 60Hz | Instant | F1 / F2 | * | F1 & F2 cleared. CR203 & Q203 shorted. |
| Q203, D to S | Short | 288V, 60Hz | Instant | F1 / F2 | * | F1 & F2 cleared. |
| Q203, D to G | Short | 288V, 60Hz | Instant | F1 / F2 | * | F1 & F2 cleared. Q203 shorted. |
| Q304, D to S | Short | 288V, 60Hz | Instant | F1 / F2 | * | F1 & F2 cleared. Q303 & CR305 shorted. |
| Fan | Blocked | 90V, 60Hz | 20 min | F1 / F2 | 0.00A | T301: 106°C. 52 V output went into a 13-sec hiccup mode 12 seconds after fault was induced, and continued in this state for 20 minutes. Test concluded when unit turned off, due to thermal shutdown. After an 8-minute cool down and fault removed, unit recovered to normal operation with manual reset. |

**Supplementary information:**

Tests 1 – 6 are deemed worse case fault testing from the perspective of the input line fuses based upon the CP1800 test data.

*Whenever the abnormal test caused fuses F1 and / or F2 to open, the fuse bodies were intact.

| 5.3 | TABLE: Fault condition tests (CP1400AC54) | | P |
|---|---|---|---|
| | Ambient temperature (°C) .....: | 55. | — |
| | Power source for EUT: Manufacturer, model/type, output rating .....: | See equipment list | — |

| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
|---|---|---|---|---|---|---|
| Airflow, Unit 1 | Blocked | 175V, 60Hz | 30 min | F1 / F2 / F100 | 0.3A | T301: 118°C, T100: 86°C<br>Main output turned off after 1 min. into fault.<br>Unit recovered to normal operation after a cool down of around 1 min. and auto reset.<br>After the initial 1-min.<br>shutdown, unit continued to operate in a cycle of on for 30 sec. then turn off for 1-min. cool down throughout test.<br>No evidence of damage to safety Insulation. |

**Supplementary information:**

| 5.3 | TABLE: Fault condition tests (CP2000AC54SD) | | P |
|---|---|---|---|
| | Ambient temperature (°C) .....: | 45. | — |
| | Power source for EUT: Manufacturer, model/type, output rating .....: | See equipment list | — |

| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
|---|---|---|---|---|---|---|
| 54 V output | Overload | 254 V 60 Hz | 2 hrs | F1 / F2 | 9.15A | T301:80.9°C,<br>Vout : 53.00 V, Iout : 39.12 A,<br>VAmax : 2073.36 W.<br>remaining output:<br>5Vaux – 5 V, 0.75 A, 3.75 W |
| 54 V output | Short Vo(+) to Vo(-) | 254 V 60 Hz | 2 hrs | F1 / F2 | 0.44 A Hiccup mode | T301:35.7°C,<br>Ishort : 493 Apk < 200 mSec.<br>Output went into a 22-sec hiccup mode instantly when fault was induced. Unit recovered to normal operation with fault removed and auto reset. |

**Supplementary information:**
Ambient environment: 45°C / 0% RH for Overload
Ambient environment: 21.8°C / 38% RH for Short,

| 5.3 | TABLE: Fault condition tests(CP2725AC54) | | P |
|---|---|---|---|
| | Ambient temperature (°C) .....: | 55. | — |
| | Power source for EUT: Manufacturer, model/type, output rating .....: | See equipment list | — |

| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
|---|---|---|---|---|---|---|
| 54 V output | Overload | 254 V 60 Hz | 2 hrs | F1 / F2 | 12.14A | T301:72.1° C.<br>$V_{out}$ : 53.82 V, $I_{out}$ : 51.86 A,<br>$VA_{max}$ : 2.791 kW.<br>No evidence of damage to safety Insulation. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 54 V output | Short Vo(+) to Vo(-) | 254 V 60 Hz | 1 hrs | F1 / F2 | 0.44A | T301:38.0° C,<br>$I_{short}$ : 914 $A_{pk}$ < 200 mSec.<br>Output tried to restart every 30 sec., staying on for 10 sec before Turning off. This routine started instantly after fault was induced.<br>Unit recovered to normal<br>Operation with fault removed and restart cycle began.<br>Test performed 3X with same results.<br>No evidence of damage to safety Insulation. |
| CR203 | Short | 254 V 60 Hz | 0.1 sec | F1 / F2 / F100 | * | F1 & F2 cleared. CR203, Q203, & Q204 shorted. |
| Q203, D to G | Short | 254 V 60 Hz | | F1 / F2 / F100 | * | F2 cleared. Q203 & Q204 shorted. |
| Q301, D to G | Short | 254 V 60 Hz | 2 sec | F1 / F2 / F100 | * | . F2 cleared. Q301, Q302, Q305, Q306, CR306, CR303, & CR302 shorted.<br>R303, R330, R331, & R304 opened.<br>C302 & IC300 bad.<br>Passed Hi-pot test. |
| CR400 | Short | 254 V 60 Hz | Instant | F1 / F2 / F100 | 0.43A | Output turned off instantly when fault was induced. Unit recovered to normal operation with fault removed and auto reset. Test performed 3X with same result |
| Fan | Stopped | 254 V 60 Hz | 1 hrs | F1 / F2 / F100 | 0.43A | T301:27.3° C, T100: 32.4° C.<br>Output turned off instantly when fault was induced. Unit recovered to normal operation with fault removed and auto reset |
| Airflow | Blocked | 254 V 60 Hz | 67 min | F1 / F2 / F100 | 11.66 A, Hiccup mode. | T301: 98.1° C, T100: 90.9° C (highest measurements).<br>After operating for 4 min. output turned off for 2 sec. After this initial cycle, unit went into a 1 min. on / 2 min. off (cool down) cycle that lasted until UUT went into a 10 sec. on / 20 sec. off cycle, 26min. into test and continued for rest of test. Throughout test, after each cycle output power dropped from the high of 53.9 V, 50.61 A to 28 V, 26 A. After blockage was removed, unit continued to cycle 10 sec. on / 20 sec. off for another 20 min. before staying on at 36 V, 34 A. During the next 19 min., output of UUT slowly increased until normal levels were obtained.<br>Passed Hi-pot test. |

**Supplementary information:**

Ambient environment: 55° C / 0% RH for Overload.

*Whenever the abnormal test caused fuses F1, F2, and / or F100 to open, the fuse bodies were intact.

| C.2 | TABLE: transformers | | | | | | P |
|---|---|---|---|---|---|---|---|
| Loc. | Tested insulation | Working voltage peak / V (2.10.2) | Working voltage rms / V (2.10.2) | Required electric strength (5.2) | Required clearance / mm (2.10.3) | Required creepage distance / mm (2.10.4) | Required distance thr. insul. (2.10.5) |
| **For all models except CP2725** | | | | | | | |
| T301 | Primary to Secondary | 582 | 323.3 | 3000Vac | 5.3* | 6.6 | 3 layers of insulation tapes |
| T100 | Primary to Secondary | 649 | 409.2 | 3000Vac | 5.5* | 4.1mm when CTI=100 for basic insulation, 2.1mm when CTI>600 for supplementary insulation (2.8* used) Total: 6.9mm% | 3 layers of insulation tapes |
| **Model CP2725** | | | | | | | |
| T301 | Primary to Secondary | 585 | 351.6 | 3000Vac | 5.3* | 7.2 | 3 layers of insulation tapes |
| T100 | Primary to Secondary | 659 | 433.1 | 3000Vac | 5.5* | 4.4mm when CTI=100 for basic insulation, 2.2mm when CTI>600 for supplementary insulation (2.8*mm used) Total: 7.2mm% | 3 layers of insulation tapes |

| Loc. | Tested insulation | Test voltage/ V | Measured clearance / mm | Measured creepage dist./ mm | Measured distance thr. insul. / mm; number of layers |
|---|---|---|---|---|---|
| **For all models except CP2725** | | | | | |
| T301 | Primary to Secondary | 3000Vac | 12.7 | 12.7 | 3 |
| T100 | Primary to Secondary | 3000Vac | 8.0 | 8.0 | 3 |
| **Model CP2725** | | | | | |
| T301 | Primary to Secondary | 3000Vac | 12.7 | 12.7 | 3 |
| T100 | Primary to Secondary | 3000Vac | 8.0 | 8.0 | 3 |

**Supplementary information:**

* Evaluated to the clearance requirements of 4000m altitude application in accordance with IEC60664-1.

% Creepage path from Pin 1 winding touching bobbin to end flange (4mm margin tape) back to Pin 8 (4mm margin tape with CTI > 600 (3M, 1318 and 44 tapes). Tubing CTI > 600 (Dupont,, 6C, 6C-J material)

| C.2 | TABLE: transformers | P |
|---|---|---|
| See Attachment 4 | | |

# ATTACHMENT 1 – NATIONAL DIFFERENCES

Report No: 30983583.010

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| ATTACHMENT TO TEST REPORT IEC 60950-1<br>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES<br>Information technology equipment – Safety –<br>Part 1: General requirements | |
|---|---|
| **Differences according to**.....: | EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 |
| **Attachment Form No**.....: | EU_GD_IEC60950_1F |
| **Attachment Originator**.....: | SGS Fimko Ltd |
| **Master Attachment**.....: | Date 2014-02 |
|  | |

**EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 – CENELEC COMMON MODIFICATIONS**

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Clauses, subclauses, notes, tables and figures which are additional to those in IEC60950-1 and it´s amendmets are prefixed "Z" | | P |
| Contents<br><br>(A2:2013) | Add the following annexes:<br>Annex ZA (normative) Normative references to international publications with their corresponding European publications<br>Annex ZB (normative) Special national conditions<br>Annex ZD (informative) IEC and CENELEC code designations for flexible cords | | P |
| General | Delete all the "country" notes in the reference document (IEC 60950-1:2005) according to the following list:<br>1.4.8 Note 2; 1.5.1 Note 2 & 3; 1.5.7.1 Note<br>1.5.8 Note 2; 1.5.9.4 Note; 1.7.2.1 Note 4, 5 & 6<br>2.2.3 Note; 2.2.4 Note; 2.3.2 Note<br>2.3.2.1 Note 2; 2.3.4 Note 2; 2.6.3.3 Note 2 & 3<br>2.7.1 Note; 2.10.3.2 Note 2; 2.10.5.13 Note 3<br>3.2.1.1 Note; 3.2.4 Note 3.; 2.5.1 Note 2<br>4.3.6 Note 1 & 2; 4.7 Note 4; 4.7.2.2 Note<br>4.7.3.1Note 2; 5.1.7.1 Note 3 & 4; 5.3.7 Note 1<br>6 Note 2 & 5; 6.1.2.1 Note 2; 6.1.2.2 Note<br>6.2.2 Note; 6.2.2.1 Note 2; 6.2.2.2 Note<br>7.1 Note 3; 7.2 Note; 7.3 Note 1 & 2<br>G.2.1 Note 2; Annex H Note 2 | | P |
| General<br>(A1:2010) | Delete all the "country" notes in the reference document (IEC 60950-1:2005/A1:2010) according to the following list:<br>1.5.7.1 Note; 6.1.2.1 Note 2<br>6.2.2.1 Note 2; EE.3 Note | | P |
| General<br>(A2:2013) | Delete all the "country" notes in the reference document (IEC 60950-1:2005/A2:2013) according to the following list:<br>2.7.1 Note *; 2.10.3.1 Note 2<br>6.2.2. Note<br>* Note of secretary: Text of Common Modification remains unchanged. | | P |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.1.1<br>(A1:2010) | **Replace** the text of NOTE 3 by the following.<br>NOTE 3 The requirements of EN 60065 may also be used to meet safety requirements for multimedia equipment. See IEC Guide 112, Guide on the safety of multimedia equipment. For television sets EN 60065 applies. | | — |
| 1.3.Z1 | Add the following subclause:<br>1.3.Z1 Exposure to excessive sound pressure<br>The apparatus shall be so designed and constructed as to present no danger when used for its intended purpose, either in normal operating conditions or under fault conditions, particularly providing protection against exposure to excessive sound pressures from headphones or earphones.<br>NOTE Z1 A new method of measurement is described in EN 50332-1, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 1: General method for "one package equipment", and in EN 50332-2, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 2: Guidelines to associate sets with headphones coming from different manufacturers. | No headphone or earphone connection. | N/A |
| (A12:2011) | In EN 60950-1:2006/A12:2011<br>Delete the addition of 1.3.Z1 / EN 60950-1:2006<br>Delete the definition 1.2.3.Z1 / EN 60950-1:2006 /A1:2010 | Deleted | — |
| 1.5.1<br><br>(Added info*) | Add the following NOTE:<br>NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2002/95/EC.<br>New Directive 2011/65/11 * | No battery used. Components do not contain mercury or lead. | P |
| 1.7.2.1<br>(A1:2010) | In addition, for a PORTABLE SOUND SYSTEM, the instructions shall include a warning that excessive sound pressure from earphones and headphones can cause hearing loss. | Not a portable sound system | N/A |
| 1.7.2.1<br>(A12.2011) | In EN 60950-1:2006/A12:2011<br>Delete NOTE Z1 and the addition for Portable Sound System.<br>Add the following clause and annex to the existing standard and amendments. | Not a portable sound system | N/A |
| | **Zx Protection against excessive sound pressure from personal music players** | | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **Zx.1 General**<br>This sub-clause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. It also specifies requirements for earphones and headphones intended for use with personal music players.<br><br>A personal music player is a portable equipment for personal use, that:<br>– is designed to allow the user to listen to recorded or broadcast sound or video; and<br>– primarily uses headphones or earphones that can be worn in or on or around the ears; and<br>– allows the user to walk around while in use.<br>NOTE 1 Examples are hand-held or body-worn portable CD players, MP3 audio players, mobile phones with MP3 type features, PDA's or similar equipment.<br><br>A personal music player and earphones or headphones intended to be used with personal music players shall comply with the requirements of this sub-clause.<br><br>The requirements in this sub-clause are valid for music or video mode only.<br><br>The requirements do not apply:<br>– while the personal music player is connected to an external amplifier; or<br>– while the headphones or earphones are not used.<br>NOTE 2 An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to play the music as a standalone music player.<br><br>The requirements do not apply to:<br>– hearing aid equipment and professional equipment;<br>NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment. | Not a portable sound system | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | – analogue personal music players (personal music players without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015.<br>NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies.<br><br>For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply. | | N/A |
| | **Zx.2 Equipment requirements**<br>No safety provision is required for equipment that complies with the following:<br>– equipment provided as a package (personal music player with its listening device), where the acoustic output $L_{Aeq,T}$ is ≤ 85 dBA measured while playing the fixed “programme simulation noise” as described in EN 50332-1; and<br>– a personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” as described in EN 50332-1.<br>NOTE 1 Wherever the term acoustic output is used in this clause, the 30 s A-weighted equivalent sound pressure level $L_{Aeq,T}$ is meant. See also Zx.5 and Annex Zx.<br><br>All other equipment shall:<br>a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and<br>b) have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and | Not a portable sound system | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | c) provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and<br>NOTE 2 Examples of means include visual or audible signals. Action from the user is always required.<br>NOTE 3 The 20 h listening time is the accumulative listening time, independent how often and how long the personal music player has been switched off.<br>d) have a warning as specified in Zx.3; and<br>e) not exceed the following:<br>1) equipment provided as a package (player with Its listening device), the acoustic output shall be ≤ 100 dBA measured while playing the fixed "programme simulation noise" described in EN 50332-1; and<br>2) a personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed "programme simulation noise" described in EN 50332-1.<br>For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. In this case T becomes the duration of the song.<br>NOTE 4 Classical music typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA.<br>For example, if the player is set with the programme simulation noise to 85 dBA, but the average music level of the song is only 65 dBA, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dBA. | Not a portable sound system | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **Zx.3 Warning**<br>The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following:<br>– the symbol of Figure 1 with a minimum height of 5 mm; and<br>– the following wording, or similar:<br><br>"To prevent possible hearing damage, do not listen at high volume levels for long periods."<br><br>  <br>**Figure 1 – Warning label (IEC 60417-6044)**<br><br>Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level. | Not a portable sound system.<br>No headphone connection | N/A |
| | **Zx.4 Requirements for listening devices (headphones and earphones)** | | N/A |
| | **Zx.4.1 Wired listening devices with analogue input**<br>With 94 dBA sound pressure output $L_{Aeq,T}$, the input voltage of the fixed "programme simulation noise" described in EN 50332-2 shall be ≥ 75 mV.<br><br>This requirement is applicable in any mode where the headphones can operate (active or passive), including any available setting (for example built-in volume level control).<br><br>NOTE The values of 94 dBA – 75 mV correspond with 85dBA – 27 mV and 100 dBA – 150 mV. | No headphone or earphone connection | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **Zx.4.2 Wired listening devices with digital input**<br>With any playing device playing the fixed "programme simulation noise" described in EN 50332-1 (and respecting the digital interface standards, where a digital interface standard exists that specifies the equivalent acoustic level), the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA.<br><br>This requirement is applicable in any mode where the headphones can operate, including any available setting (for example built-in volume level control, additional sound feature like equalization, etc.).<br><br>NOTE An example of a wired listening device with digital input is a USB headphone. | No headphone or earphone connection | N/A |
| | **Zx.4.3 Wireless listening devices**<br>In wireless mode:<br>– with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and<br>– respecting the wireless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and<br>– with volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the abovementioned programme simulation noise, the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA.<br><br>NOTE An example of a wireless listening device is a Bluetooth headphone. | No headphone or earphone connection | N/A |
| | **Zx.5 Measurement methods**<br>Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval T shall be 30 s.<br><br>NOTE Test method for wireless equipment provided without listening device should be defined. | No headphone or earphone connection | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.7.1 | Replace the subclause as follows:<br>Basic requirements<br>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):<br>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;<br>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; | For building into other equipment | N/A |
| | 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.<br>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. | For building into other equipment | N/A |
| 2.7.2 | This subclause has been declared 'void'. | Considered | P |
| 3.2.3 | Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses. | Considered | N/A |
| 3.2.5.1 | Replace "60245 IEC 53" by "H05 RR-F";<br>"60227 IEC 52" by "H03 VV-F or H03 VVH2-F";<br>"60227 IEC 53" by "H05 VV-F or H05 VVH2-F2".<br>In Table 3B, replace the first four lines by the following:<br>Up to and including 6 \| 0,75 [a] \|<br>Over 6 up to and including 10\| (0,75) [b] 1,0 \|<br>Over 10 up to and including 16\| (1,0) [c] 1,5 \|<br>In the conditions applicable to Table 3B delete the words "in some countries" in condition [a].<br>In NOTE 1, applicable to Table 3B, delete the second sentence. | Considered | N/A |
| 3.2.5.1 (A2:2013) | NOTE Z1 The harmonised code designations corresponding to the IEC cord types are given in Annex ZD | Considered | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.3.4 | In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following:<br>Over 10 up to and including 16 \| 1,5 to 2,5 \| 1,5 to 4 \|<br>Delete the fifth line: conductor sizes for 13 to 16 A | | N/A |
| 4.3.13.6<br>(A1:2010) | Replace the existing NOTE by the following:<br>NOTE Z1 Attention is drawn to:<br>1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz, and<br>2006/25/EC: Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artifical optical radiation). | No hazardous radiation | N/A |
| | Standards taking into account mentioned Recommendation and Directive which demonstrate compliance with the applicable EU Directive are indicated in the OJEC. | No hazardous radiation | N/A |
| Annex H | Replace the last paragraph of this annex by:<br>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.<br>Replace the notes as follows:<br>NOTE These values appear in Directive 96/29/Euratom.<br>Delete NOTE 2. | No hazardous radiation | N/A |
| Bibliography | Additional EN standards. | Considered | — |

| ZA | NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS | — |
|---|---|---|

| ZB ANNEX (normative)<br>SPECIAL NATIONAL CONDITIONS (EN) | | | |
|---|---|---|---|
| 1.2.4.1 | In **Denmark**, certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets. | No plug | N/A |
| 1.2.13.14<br>(A11:2009) | In **Norway** and **Sweden**, for requirements see 1.7.2.1 and 7.3 of this annex. | | N/A |
| 1.5.7.1<br>(A11:2009) | In **Finland, Norway** and **Sweden**, resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2. | No resistors bridging basic insulation | N/A |
| 1.5.8 | In **Norway**, due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V). | | P |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.5.9.4 | In **Finland**, **Norway** and **Sweden**, the third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex. | No TNV | N/A |
| 1.7.2.1 | In **Finland**, **Norway** and **Sweden**, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet.<br>The marking text in the applicable countries shall be as follows:<br>In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"<br>In **Norway**: “Apparatet må tilkoples jordet stikkontakt”<br>In **Sweden**: “Apparaten skall anslutas till jordat uttag” | For building into other equipment | N/A |
| 1.7.2.1<br>(A11:2009) | In **Norway** and **Sweden**, the screen of the cable distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation need to be isolated from the screen of a cable distribution system.<br>It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by e.g. a retailer.<br>The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in:<br>“Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).” | | |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | NOTE In Norway, due to regulation for installations of cable distribution systems, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min.<br>Translation to Norwegian (the Swedish text will also be accepted in Norway):<br>"Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet<br>utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel- TV nettet."<br>Translation to Swedish:<br>"Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan<br>utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för<br>brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät<br>galvanisk isolator finnas mellan utrustningen och kabel-TV nätet." | For building into other equipment | N/A |
| 1.7.2.1<br>(A2:2013) | In **Denmark**, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet.<br>The marking text in **Denmark** shall be as follows:<br>In **Denmark**: "Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord." | For building into other equipment | N/A |
| 1.7.5<br><br><br><br><br><br>1.7.5<br>(A11:2009) | In **Denmark**, socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment. For STATIONARY EQUIPMENT the socket-outlet shall be in accordance with Standard Sheet DK 1-1b or DK 1-5a.<br>For **CLASS II EQUIPMENT** the socket outlet shall be in accordance with Standard Sheet DKA 1-4a. | No socket outlets provided | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.7.5<br>(A2:2013) | In **Denmark**, socket-outlets for providing power to other equipment shall be in accordance with the DS 60884-2-D1:2011.<br>For class I equipment the following Standard Sheets are applicable: DK 1-3a, DK 1-1c, DK 1-1d, DK 1-5a or DK 1-7a, with the exception for STATIONARY EQUIPMENT where the socket-outlets shall be in accordance with Standard Sheet DK 1-1b, DK 1-1c, DK 1-1d or DK 1-5a.<br>Socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance with DS 60884-2-D1 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with by DS 60884-2-D1 Standard Sheet DKA 1-3a or DKA 1-3b.<br>Justification<br>the Heavy Current Regulations, 6c | No socket outlets provided | N/A |
| 2.2.4 | In **Norway**, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex. | Not such equipment | N/A |
| 2.3.2 | In **Finland**, **Norway** and **Sweden** there are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex. | Considered no TNV | N/A |
| 2.3.4 | In **Norway**, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex. | Not such equipment | N/A |
| 2.6.3.3 | In the **United Kingdom**, the current rating of the circuit shall be taken as 13 A, not 16 A. | Considered | P |
| 2.7.1 | In the **United Kingdom**, to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN EQUIPMENT, tests according to 5.3 shall be conducted, using an external protective device rated 30 A or 32 A. If these tests fail, suitable protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT, so that the requirements of 5.3 are met. | Not direct plug in equipment | N/A |
| 2.10.5.13 | In **Finland**, **Norway** and **Sweden**, there are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex. | No TNV | N/A |
| 3.2.1.1 | In **Switzerland**, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets:<br>SEV 6532-2.1991 Plug Type 15 3P+N+PE 250/400 V, 10 A | No supply cord provided | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | SEV 6533-2.1991 Plug Type 11 L+N 250 V, 10 A<br>SEV 6534-2.1991 Plug Type 12 L+N+PE 250 V, 10 A<br>In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998:<br>SEV 5932-2.1998: Plug Type 25 , 3L+N+PE 230/400 V, 16 A<br>SEV 5933-2.1998:Plug Type 21, L+N, 250 V, 16A<br>SEV 5934-2.1998: Plug Type 23, L+N+PE 250 V, 16 A | No supply cord provided | N/A |
| 3.2.1.1 | In **Denmark**, supply cords of single-phase equipment having a rated current not exceeding13 A shall be provided with a plug according to the Heavy Current Regulations, Section 107-2-D1.<br>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.<br>If poly-phase equipment and single-phase equipment having a RATED CURRENT exceeding 13 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 107-2-D1 or EN 60309-2. | No supply cord provided | N/A |
| 3.2.1.1<br>(A2:2013) | In **Denmark**, supply cords of single-phase equipment having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1.<br>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.<br>If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2.<br>Justification<br>the Heavy Current Regulations, 6c | No supply cord provided | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.2.1.1 | In **Spain**, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994.<br>Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993.<br>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994.<br>If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2. | No supply cord provided | N/A |
| 3.2.1.1 | In the **United Kingdom**, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations.<br>NOTE 'Standard plug' is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug. | No supply cord provided | N/A |
| 3.2.1.1 | In **Ireland**, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug, shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 - National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997. | No plug provided | N/A |
| 3.2.4 | In **Switzerland**, for requirements see 3.2.1.1 of this annex. | No plug provided | N/A |
| 3.2.5.1 | In the **United Kingdom**, a power supply cord with conductor of 1,25 mm2 is allowed for equipment with a rated current over 10 A and up to and including 13 A. | No supply cord provided | N/A |
| 3.3.4 | In the **United Kingdom**, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is:<br>• 1,25 $mm^2$ to 1,5 $mm^2$ nominal cross-sectional area. | No supply cord provided | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.3.6 | In the **United Kingdom**, the torque test is performed using a socket outlet complying with BS 1363 part 1:1995, including Amendment 1:1997 and Amendment 2:2003 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply. | Not for direct plug in | N/A |
| 4.3.6 | In **Ireland**, DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 - National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997. | Not for direct plug in | N/A |
| 5.1.7.1 | In **Finland**, **Norway** and **Sweden** TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment:<br>• STATIONARY PLUGGABLE EQUIPMENT TYPE A that<br>is intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, for example, in a telecommunication centre; and<br>has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and<br>is provided with instructions for the installation of that conductor by a SERVICE PERSON;<br>• STATIONARY PLUGGABLE EQUIPMENT TYPE B;<br>• STATIONARY PERMANENTLY CONNECTED EQUIPMENT. | For building into other equipment | N/A |
| 6.1.2.1<br>(A1:2010) | In **Finland**, **Norway** and **Sweden**, add the following text between the first and second paragraph of the compliance clause:<br>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either<br>- two layers of thin sheet material, each of which shall pass the electric strength test below, or<br>- one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.<br>Alternatively for components, there is no distance through insulation requirements for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in | No TNV circuits | N/A |

| IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | accordance with the compliance clause below and in addition<br>- passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and<br>- is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. | | |
| | It is permitted to bridge this insulation with an optocoupler complying with 2.10.5.4 b).<br><br>It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2.<br>A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions:<br>- the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950-1:2006, 6.2.2.1;<br>- the additional testing shall be performed on all the test specimens as described in EN 60384-14:<br>- the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14. | No TNV circuits | N/A |
| 6.1.2.2 | In **Finland**, **Norway** and **Sweden**, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON. | No TNV circuits | N/A |
| 7.2 | In **Finland**, **Norway** and **Sweden**, for requirements see 6.1.2.1 and 6.1.2.2 of this annex.<br>The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM. | No connection to cable distribution system | N/A |
| 7.3 (A11:2009) | In **Norway** and **Sweden**, for requirements see 1.2.13.14 and 1.7.2.1 of this annex. | No connection to cable distribution system | N/A |

**Annex ZD**
**(informative)**

**IEC and CENELEC code designations for flexible cords**

| Type of flexible cord | Code designations | |
|---|---|---|
| | IEC | CENELEC |
| **PVC insulated cords** | | |
| Flat twin tinsel cord | 60227 IEC 41 | H03VH-Y |
| Light polyvinyl chloride sheathed flexible cord | 60227 IEC 52 | H03VV-F<br>H03VVH2-F |
| Ordinary polyvinyl chloride sheathed flexible cord | 60277 IEC 53 | H05VV-F<br>H05VVH2-F |
| **Rubber insulated cords** | | |
| Braided cord | 60245 IEC 51 | H03RT-F |
| Ordinary tough rubber sheathed flexible cord | 60245 IEC 53 | H05RR-F |
| Ordinary polychloroprene sheathed flexible cord | 60245 IEC 57 | H05RN-F |
| Heavy polychloroprene sheathed flexible cord | 60245 IEC 66 | H07RN-F |
| **Cords having high flexibility** | | |
| Rubber insulated and sheathed cord | 60245 IEC 86 | H03RR-H |
| Rubber insulated, crosslinked PVC sheathed cord | 60245 IEC 87 | H03RV4-H |
| Crosslinked PVC insulated and sheathed cord | 60245 IEC 88 | H03V4V4-H |

| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

**ATTACHMENT TO TEST REPORT IEC 60950-1**
**U.S.A. NATIONAL DIFFERENCES**
Information technology equipment – Safety –
Part 1: General requirements

| | |
|---|---|
| **Differences according to**.....: | UL 60950-1, Edition 2, Amendment 2 |
| **Attachment Form No**.....: | N/A |
| **Attachment Originator**.....: | N/A |
| **Master Attachment**.....: | N/A |

| | | | |
|---|---|---|---|
| | **Special national conditions** | | P |
| 1.1.1 | All equipment is to be designed to allow installation in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. | In accordance with the National Electrical Code(NEC) and the Canadian Electrical Code(CEC) part 1 CAN/CSA C22.1, ANSI/NFPA 70, and unless marked or otherwise identified, the Standard for Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75. | P |
| | Also, unless marked or otherwise identified, installation is allowed per the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75. | - | P |
| 1.1.2 | Baby monitors are required to additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors. | - | N/A |
| 1.4.14 | For Pluggable Equipment Type A, the protection in the installation is assumed to be 20 A. | Not equipment of this type | N/A |
| 1.5.5 | For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the NEC. | No interconnecting cord provided with equipment | N/A |
| | For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the NEC are required to have special construction features and identification markings. | No interconnecting cord provided with equipment | N/A |
| 1.7.1 | Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. | Not equipment of this type | N/A |
| | A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and | Not equipment of this type | N/A |
| | - if it is part of a range that extends into the Table 2 "Normal Operating Conditions." | Not equipment of this type | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | A voltage rating shall not be lower than the specified "Normal Operating Conditions," unless it is part of a range that extends into the "Normal Operating Conditions." | Not equipment of this type | N/A |
| 1.7.7 | Wiring terminals intended to supply Class 2 outputs in accordance with the NEC or CEC Part 1 shall be marked with the voltage rating and “Class 2” or equivalent. | Not equipment of this type | N/A |
| | - Marking shall be located adjacent to the terminals | Not equipment of this type | N/A |
| | - Marking shall be visible during wiring | Not equipment of this type | N/A |
| 2.5 | Where a fuse is used to provide Class 2, Limited Power Source, or TNV current limiting, it shall not be operator-accessible unless it is not interchangeable. | Not equipment of this type | N/A |
| 2.6 | Equipment with isolated ground (earthing) receptacles are required to comply with NEC 250.146(D) and CEC 10-112 and 10-906(8). | Not equipment of this type | N/A |
| 2.7.1 | Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable. | No standard supply outlet | N/A |
| | Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection. | No standard supply outlet | N/A |
| 3.2 | Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains shall be in accordance with the NEC/CEC. | Equipment is for building into other equipment | N/A |
| 3.2.1 | Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment. | No power cord and plug provided. | N/A |
| 3.2.1.2 | Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, is required to comply with special earthing, wiring, marking and installation instruction requirements. | | N/A |
| 3.2.3 | Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs. | No power cord and plug provided. | N/A |
| 3.2.5 | Power supply cords are required to be no longer than 4.5 m in length. | No power cord and plug provided. | N/A |
| | Minimum cord length is required to be 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement. | No power cord and plug provided. | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Flexible power supply cords are required to be compatible with Article 400 of the NEC, and Tables 11 & 12 of the CEC. | No power cord and plug provided. | N/A |
| 3.2.9 | Permanently connected equipment is required to have a suitable wiring compartment and wire bending space. | Equipment for building into other equipment | N/A |
| 3.3 | Wiring terminals and associated spacings for field wiring connections shall comply with CSA C22.2 No. 0. | For building into other equipment | N/A |
| 3.3.3 | Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 $mm^2$). | No wire binding screws | N/A |
| 3.3.4 | Terminals for permanent wiring, including protective earthing terminals, are required to be suitable for U.S./Canadian wire gauge sizes, | Component for building into end use equipment | N/A |
| | - rated 125 per cent of the equipment rating, and | - | N/A |
| | - are specially marked when specified (1.7.7). | - | N/A |
| 3.3.5 | First column of Table 3E revised to require “Smaller of the RATED CURRENT of the equipment or the PROTECTIVE CURRENT RATING of the circuit under consideration.” | Component for building into end use equipment | N/A |
| 3.4.2 | Motor control devices are required for cord-connected equipment with a motor if the equipment is rated more than 12 A, | Not a motor control device | N/A |
| | - or if the motor has a nominal voltage rating greater than 120 V | - | N/A |
| | - or is rated more than 1/3 hp (locked rotor current over 43 A) | - | N/A |
| 3.4.8 | Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position. | No disconnect device. Equipment is for building in | N/A |
| 3.4.11 | For computer room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote power-off circuit. | Component for building into end use equipment | N/A |
| 4.3.12 | The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30. | No flammable liquid | N/A |
| 4.3.13.5.1 | Equipment with lasers is required to meet the U.S. Code of Federal Regulations 21 CFR 1040 (and the Canadian Radiation Emitting Devices Act, REDR C1370). | LEDs, used for indicating purposes, are inherently Class 1 | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.7 | For computer room applications, automated information storage systems with combustible media greater than 0.76 $m^3$ (27 cu ft) are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge. | Component for building into end use equipment. | N/A |
| 4.7.3.1 | For computer room applications, enclosures with combustible material measuring greater than 0.9 $m^2$ (10 sq ft) or a single dimension greater than 1.8 m (6 ft) are required to have a flame spread rating of 50 or less. | Component for building into end use equipment. | N/A |
| | For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less. | - | N/A |
| | Non-metallic enclosures of equipment for use in spaces used for environmental air (plenums) are required to comply with UL 2043. | - | N/A |
| Annex H | Equipment that produces ionizing radiation is required to comply with the U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370). | No ionizing radiation generated. | N/A |
| | **Other National Differences** | | |
| 1.5.1 | Some components and materials associated with the risk of fire, electric shock, or personal injury are required to have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. These components include:<br>attachment plugs, battery backup systems, battery packs, cathode ray tubes, circuit breakers, communication circuit accessories, connectors (used for current interruption of non-LPS circuits), cord sets and power supply cords, direct plug-in equipment, electrochemical capacitor modules (energy storage modules with ultracapacitors), enclosures (outdoor), flexible cords and cables, fuses (branch circuit), fuseholders, ground-fault current interrupters, industrial control equipment, insulating tape, interconnecting cables, lampholders, limit controls, printed wiring, protectors for communications circuits, receptacles, solid state controls, supplementary protectors, switches (including interlock switches), thermal cutoffs, thermostats, (multi-layer) transformer winding wire, surge protective devices, tubing, vehicle battery adapters, wire connectors, and wire and cables. | See critical components list – Table 1.5.1 | P |
| 1.6.1.2 | A circuit for connection to the DC Mains Supply is classified as a SELV Circuit, a TNV-2 Circuit or a Hazardous Voltage Circuit depending on the maximum operating voltage of the supply. | Component for building into end use equipment. | N/A |

| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | This maximum operating voltage shall include consideration of the battery charging “float voltage” associated with the intended supply system, regardless of the marked power rating of the equipment. | - | N/A |
| 2.3.1 | For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 Vpeak or 60 Vd.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions. | No TNV | N/A |
| 2.3.2.1 | In the event of a single fault between TNV and SELV circuits, the limits of 2.2.3 apply to SELV Circuits and accessible conductive parts. | No TNV | N/A |
| 2.6.2 | Equipment with functional earthing is required to be marked with the functional earthing symbol (IEC 60417-6092). | | N/A |
| 2.6.3.4 | Protective bonding conductors of non-standard protective bonding constructions (e.g., printed circuit traces) may be subjected to the additional limited short circuit test conditions specified. | Not employed | N/A |
| 4.2.8.1 | Enclosures around CRTs with a face diameter of 160 mm or more are required to reduce the risk of injury due to the implosion of the CRT. | No CRTs | N/A |
| 4.3.2 | Equipment with handles is required to comply with special loading tests. | No handles | N/A |
| 4.3.8 | Battery packs for both portable and stationary applications are required to comply with special component requirements. | No battery | N/A |
| 5.1.8.3 | Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement tests. | No TNV | N/A |
| 5.3.7 | Internal (e.g., card cage) SELV circuit connectors and printed wiring board connectors that are accessible to the operator and that deliver power are to be overloaded. | No internal connectors accessible to operator. | N/A |
| | During abnormal operating testing, if a circuit is interrupted by the opening of a component, the test shall be repeated twice (three tests total) using new components as necessary. | - | N/A |
| 6.4 | Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC. | No TNV | N/A |
| Annex EE | UL articulated accessibility probe (Fig EE.3) required for assessing accessibility to document/media shredders instead of the Figure 2A test finger. | Not such equipment | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Annex M.2 | Continuous ringing signals up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions. | No ringing signals | N/A |
| Annex NAD | Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements. | Not such equipment | N/A |

## ATTACHMENT TO TEST REPORT IEC 60950-1
## CANADIAN NATIONAL DIFFERENCES

Information technology equipment – Safety – Part 1: General requirements

| | |
|---|---|
| **Differences according to ..... :** | CAN/CSA-C22.2 No. 60950-1A-07 |
| **Attachment Form No. ..... :** | N/A |
| **Attachment Originator ..... :** | N/A |
| **Master Attachment ..... :** | N/A |

| | | | |
|---|---|---|---|
| | **Special national conditions** | | P |
| 1.1.1 | All equipment is to be designed to allow installation in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. | Equipment is designed to be installed in accordance with the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. | P |
| | Also, unless marked or otherwise identified, installation is allowed per the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75. | | P |
| 1.4.14 | For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A. | Equipment is for building in. | N/A |
| 1.5.5 | For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the CEC/NEC. | | N/A |
| | For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the CEC are required to have special construction features and identification markings. | | N/A |
| 1.7.1 | Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. | Equipment is for building in. | N/A |
| | A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and | | N/A |

| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - if it is part of a range that extends into the Table 2 "Normal Operating Conditions." | | N/A |
| | A voltage rating is not to be lower than the specified "Normal Operating Conditions," unless it is part of a range that extends into the "Normal Operating Conditions." | | N/A |
| 1.7.7 | Wiring terminals intended to supply Class 2 outputs in accordance with CEC Part 1 or NEC are marked with the voltage rating and “Class 2” or equivalent. | No such terminals | N/A |
| | - Marking is located adjacent to the terminals | | N/A |
| | - Marking is visible during wiring | | N/A |
| 2.5 | Fuse providing Class 2, Limited Power Source, or TNV current limiting is not operator-accessible unless it is not interchangeable. | Not such equipment | N/A |
| 2.6.3.3 | Modify first column on Table 2D to “Smaller of the RATED CURRENT of the equipment or the PROTECTIVE CURRENT RATING of the circuit under consideration.” | | — |
| 2.7.1 | Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is provided for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable. | | N/A |
| | Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, provided with special transformer overcurrent protection. | Not such equipment | N/A |
| 3.2 | Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains is in accordance with the NEC/CEC. | Equipment is for building-in. | N/A |
| 3.2.1 | Attachment plugs of power supply cords are rated not less than 125 percent of the rated current of the equipment. | | N/A |
| 3.2.1.2 | Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment comply with special earthing, wiring, marking and installation instruction requirements. | Not such equipment | N/A |
| 3.2.3 | Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs. | Equipment is for building in. | N/A |
| 3.2.5 | Power supply cords are no longer than 4.5 m in length. | No power supply cord provided | N/A |
| | Minimum cord length is 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement. | | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Flexible power supply cords are compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC. | | N/A |
| 3.2.9 | Permanently connected equipment have suitable wiring compartment and wire bending space. | For building into other equipment | N/A |
| 3.3 | Wiring terminals and associated spacings for field wiring connections comply with CSA C22.2 No. 0. | | N/A |
| 3.3.3 | Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 $mm^2$). | No wire binding screws used | N/A |
| 3.3.4 | Terminals for permanent wiring, including protective earthing terminals, are suitable for Canadian/US wire gauge sizes, are | Equipment is for building in | N/A |
| | - rated 125 percent of the equipment rating, and | | N/A |
| | - are specially marked when specified (1.7.7). | | N/A |
| 3.3.5 | Revise first column of Table 3E to “Smaller of the RATED CURRENT of the equipment or the PROTECTIVE CURRENT RATING of the circuit under consideration.” | | P |
| 3.4.2 | Motor control devices are provided for cord-connected equipment with a motor if the equipment is rated more than 12 A, | Not such equipment | N/A |
| | - or if the motor has a nominal voltage rating greater than 120 V | | N/A |
| | - or is rated more than 1/3 hp (locked rotor current over 43 A) | | N/A |
| 3.4.8 | Vertically-mounted disconnect switches and circuit breakers have the "on" position indicated by the handle in the up position. | Equipment is for building in. | N/A |
| 3.4.11 | For computer room applications, equipment with battery systems capable of supplying 750 VA for five minutes have a battery disconnect means that may be connected to the computer room remote power-off circuit. | Equipment is for building in. | N/A |
| 4.3.12 | The maximum quantity of flammable liquid stored in equipment complies with NFPA 30. | Not such equipment | N/A |
| 4.3.13.5 | Equipment with lasers meets the Canadian Radiation Emitting Devices Act, REDR C1370 and/or Code of Federal Regulations 21 CFR 1040, as applicable. | LEDs, used for indicating only, are inherently Class 1 | N/A |
| 4.7 | For computer room applications, automated information storage systems with combustible media greater than 0.76 $m^3$ (27 cu ft) have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge. | Equipment is for building in | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.7.3.1 | For computer room applications, enclosures with combustible material measuring greater than 0.9 $m^2$ (10 sq ft) or a single dimension greater than 1.8 m (6 ft) have a flame spread rating of 50 or less. | | N/A |
| | For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less. | | N/A |
| Annex H | Equipment that produces ionizing radiation comply with the Canadian Radiation Emitting Devices Act, REDR C1370 and/or Code of Federal Regulations, 21 CFR 1020, as applicable. | No X-rays produced | N/A |
| | **Other National Differences** | | |
| 1.5.1 | Some components and materials associated with the risk of fire, electric shock, or personal injury have component or material ratings in accordance with the applicable national (Canadian and/or U.S.) component or material standard requirements. | Equipment is for building in. | N/A |
| 1.6.1.2 | A circuit for connection to the DC Mains Supply is classified as either a SELV Circuit, TNV-2 Circuit or Hazardous Voltage Circuit depending on the maximum operating voltage of the supply. | Not such equipment | N/A |
| | This maximum operating voltage includes consideration of the battery charging “float voltage” associated with the intended supply system, regardless of the marked power rating of the equipment. | | N/A |
| 2.3.1 | For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 Vpeak or 60 Vd.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions. | No TNV circuit | N/A |
| 2.3.2.1 | In the event of a single fault between TNV and SELV circuits, the limits of 2.2.3 apply to SELV Circuits and accessible conductive parts. | No TNV, no SELV | N/A |
| 2.6.3.4 | Protective bonding conductors of non-standard protective bonding constructions (e.g., printed circuit traces) may be subjected to the additional limited short circuit test conditions specified. | Non-standard construction not used | N/A |
| 4.2.8.1 | Enclosures around CRTs with a face diameter of 160 mm or more reduce the risk of injury due to the implosion of the CRT. | No CRT used | N/A |
| 4.3.2 | Equipment with handles complies with special loading tests. | | N/A |
| 5.1.8.3 | Equipment intended to receive telecommunication ringing signals comply with a special touch current measurement tests. | Not such equipment | N/A |

# ATTACHMENT 1 – NATIONAL DIFFERENCES



| National Differences to IEC 60950-1:2005 + A2:2013 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.3.7 | Internal (e.g., card cage) SELV circuit connectors and printed wiring board connectors that are accessible to the operator and that deliver power are overloaded. | Equipment is for building in. | N/A |
| | During abnormal operating testing, if a circuit is interrupted by the opening of a component, the test shall be repeated twice (three tests total) using new components as necessary | | N/A |
| 6.4 | Equipment intended for connection to telecommunication network outside plant cable is protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC. | | N/A |
| Annex EE | Articulated accessibility probe (Fig EE.3) is used for assessing accessibility to document/media shredders instead of the Figure 2A test finger. | Equipment is for building in. | N/A |
| M.2 | Continuous ringing signals up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions. | Not such equipment | N/A |
| Annex NAD | Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear comply with special acoustic pressure requirements. | | N/A |

**END OF NATIONAL DIFFERENCES**

# ATTACHMENT 2 – Photo Documentation

| | |
|---|---|
| Product: | Component Switching Power Supply for Information Technology Equipment |
| Type Designation: | CP1400, CP1800, CP2000, CP2100, CP2725 Series |
| Report No: | 30983583.010 |

**Att. 2.1**

**Att. 2.2**

# ATTACHMENT 2 – Photo Documentation

Product: Component Switching Power Supply for Information Technology Equipment
Type Designation: CP1400, CP1800, CP2000, CP2100, CP2725 Series
Report No: 30983583.010

## Att. 2.3

## Att. 2.4