

## UL TEST REPORT AND PROCEDURE

**Standard:** UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements)  
CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)

**Certification Type:** Component Recognition

**CCN:** QQQQ2, QQQQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)

**Product:** DC/DC Converter

**Model:** CC1R5-wwxyz#-E, CC3-wwxyz#-E, and CC6-wwxyz#-E (ww = 05, 12, 24 or 48. xx = 03, 05 or 12. y = S or D. z = F, R or S. # = A to Z or blank.) (y = D only if xx = 12)

**Rating:**

Input:  
4.5 - 9 Vdc (for Model ww = 05)  
9 - 18 Vdc (for Model ww = 12)  
18 - 36 Vdc (for Model ww = 24)  
36 - 76 Vdc (for Model ww = 48)

Output:  
3.3 to 3.6 Vdc, 400 mA, 1.32 W (for Model CC1R5-ww03Sz#-E)  
3.3 to 3.6 Vdc, 800 mA, 2.64 W (for Model CC3-ww03Sz#-E)  
3.3 to 3.6 Vdc, 1200 mA, 3.96 W (for Model CC6-ww03Sz#-E)

5.0 to 6.0 Vdc, 300 mA, 1.5 W (for Model CC1R5-ww05Sz#-E)  
5.0 to 6.0 Vdc, 600 mA 3.0W (for Model CC3-ww05Sz#-E)  
5.0 to 6.0 Vdc, 1000 mA, 5.0 W (for Model CC6-0505Sz#-E)  
5.0 to 6.0 Vdc, 1200 mA, 6.0 W (for Model CC6-ww05Sz#-E, except ww = 05)

12 to 15 Vdc, 125 mA, 1.5 W (for Model CC1R5-ww12Sz#-E)  
12 to 15 Vdc, 250 mA, 3.0 W (for Model CC3-ww12Sz#-E)  
12 to 15 Vdc, 500 mA, 6.0 W (for Model CC6-ww12Sz#-E)

+ / - 12 to + / - 15 Vdc, 60 mA, 1.44 W (for Model CC1R5-ww12Dz#-E)  
+ / - 12 to + / - 15 Vdc, 125 mA, 3.0 W (for Model CC3-ww12Dz#-E)  
+ / - 12 to + / - 15 Vdc, 250 mA, 6.0 W (for Model CC6-ww12Dz#-E)

**Applicant Name and Address:** TDK-LAMBDA CORP  
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Report Reference #

E132035-A31-UL

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

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### Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
  - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
  - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
  - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

### Product Description

The products are DC/DC Converter with only one dc output.

### Model Differences

The differences between Models CC1R5-wwxyz#-E, CC3-wwxyz#-E, and CC6-wwxyz#-E are model designation, output wattage, type and dimensions.

ww: Input voltage (05 = 5V, 12 = 12V, 24 = 24V, 48 = 48V)

xx: output voltage (03 = 3.3V, 05 = 5.0V, 12 = 12V)

y: Number of output circuit (S = 1, D = 2)

z: structural of terminal (F = DIP type, R = SMD type, S = SIP type). See Enclosure Ids. 3-01 to 3-09 for F (DIP type), Enclosure Ids. 3-10 to 3-17 for S (SIP type). R (SMD type) is the same structure as F (DIP type) except for the terminal shapes).

#: represents minor non-critical variations.

The suffix of "#" in the model name is omitted in the pages that follow.

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A
- Operating condition : continuous
- Access location : N/A
- Over voltage category (OVC) : N/A
- Mains supply tolerance (%) or absolute mains supply values : N/A
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : N/A
- Considered current rating (A) : N/A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0

- Altitude of operation (m) : less than 2000 m
- Altitude of test laboratory (m) : less than 2000 m
- Mass of equipment (kg) : < 10 g
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 50°C (100% load) / 85°C (40% load) except CC6-wwxxSz-E and CC6-wwxxDz-E. , CC6-wwxxSz-E: 50°C (100% load) / 80°C (40% load). , CC6-wwxxDz-E: 35°C (100% load) / 80°C (40% load).
- The components tested using dc supply source under 4.5 Vdc up to 76 Vdc input voltage.
- The maximum working voltages present inside the components are: 198 Vpk / 124 Vrms. See sub-clause 2.10.2 for the exact model.
- The components provide functional insulation only.

**Engineering Conditions of Acceptability**

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following secondary output circuits are SELV: Output of each model.
- The following secondary output circuits are at non-hazardous energy levels: Output of each model.
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Not required
- The following end-product enclosures are required: Fire, Electrical
- The outputs supply SELV when the component is connected to a SEC HAZ/V not exceeding 76 Vdc and the source is separated from PRI by double or reinforced insulation.
- A Heating Test shall be considered in end product.
- The metal housing is considered hazardous live, due to functional insulation to HAZ/V only. The maximum working voltages inside are 198 Vpk and 124 Vrms need to be considered for insulation in the end product.

**Additional Information**

Unless otherwise specified, Component Failure Test and SELV Reliability Test were conducted on Models CC1R5-4812SF-E, CC1R5-4812DF-E, CC3-4812SF-E, CC3-4812DF-E, CC6-4812SF-E, and CC6-4812DF-E; Heating Test and Transformer Abnormal Operation Test were conducted on Models CC1R5-0503SF-E, CC1R5-0512DF-E, CC3-2403SF-E, CC3-0512DF-E, CC6-1203SF-E, and CC60512DF-E; and Humidity Test was conducted on Models CC1R5-0503SF-E, CC1R5-4812DF-E, CC3-0503SF-E, CC3-4812DF-E, CC6-0503SF-E, and CC6-48-12DF-E.

Electric Strength Test for basic insulation between input terminals and output terminals was conducted on the above models.

**Markings and instructions**

Clause Title	Marking or Instruction Details
1.7.1 Power rating - Company identification	Listee's or Recognized Company's name, Trade Name, Trademark or File Number with UL Recognized Component Mark. Marking is on product or on smallest package. When marking is on smallest package, the UL Recognized Component Mark is not marked.