# UL TEST REPORT AND PROCEDURE

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|---|---|
| **Standard:** | UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements)<br>CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements) |
| **Certification Type:** | Component Recognition |
| **CCN:** | QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment) |
| **Product:** | Non-Isolated Power Supply, DC-DC converter |
| **Model:** | Series i6A24***A%%%V-0xx(-R)<br>where *** represents rated output current<br>between 0A - 14A, %%% represents rated output voltage between 0.6Vdc - 28Vdc and 0xx indicates a number or alphanumeric character<br>which affects non safety related features<br>Optional -R indicated RoHS compliance<br><br>Series i6A24***A%%%V-Nxx(-R)<br>where *** represents rated output current between 0A - 8A, %%%represents rated output voltage between -0.6Vdc - -30Vdc and Nxx indicates a number or alphanumeric character which affects non-safety related features. Optional -R indicates RoHS compliance.<br><br>Series i6A4W***A%%%V-0xx(-R)<br>where *** represents rated output current<br>between 0A - 20A, %%% represents rated output voltage between 0.6Vdc - 15Vdc and 0xx indicates a number or alphanumeric character<br>which affects non safety related features<br>Optional -R indicated RoHS compliance |
| **Rating:** | Series i6A24***A%%%V-0xx(-R)<br>Input: 9-40Vdc, 15A Max<br>Output: 0.6-28Vdc, 14A, 250W Max<br><br>Series i6A24***A%%%V-Nxx(-R)<br>Input: 9-40Vdc, 15A Max<br>Output: -0.6- -30Vdc, 8A, 75W Max<br><br>Series i6A4W***A%%%V-0xx(-R)<br>Input: 9-55Vdc, 16.5A Max<br>Output: 0.6-15Vdc, 20A, 250W Max |
| **Applicant Name and Address:** | TDK-LAMBDA AMERICAS INC<br>SUITE 100<br>3320 MATRIX DR<br>RICHARDSON TX 75082<br>UNITED STATES |

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.

Prepared by: Lesley Green Reviewed by: William E. Platts

**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 product consists of high density Non-Isolated Power Supply, DC-DC converter module. The converter is provided with input terminal pins for factory installation onto a printed wiring board with a connection to a dc source of supply and output terminal pins.

**Model Differences**

All models are identical except for minor changes to the components based upon the output voltage rating of the unit.

**Technical Considerations**

- Equipment mobility : for building-in
- Connection to the mains : No direct connection
- Operating condition : continuous
- Access location : N/A
- Over voltage category (OVC) : for building-in
- 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 : Class III (supplied by SELV)
- Considered current rating of protective device as part of the building installation (A) : 30 A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : up to 2000 m
- Altitude of test laboratory (m) : not more than 2000 m
- Mass of equipment (kg) : less than 1 kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer’s specification of: 25°C

**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 power DC Converter is intended to be supplied isolated secondary circuitry in an end-use application.
- All Units were tested with an external 30A fuse during Abnormal testing.
- The following secondary output circuits are SELV: All
- The following secondary output circuits are at non-hazardous energy levels: Series i6A24***A%%%V-Nxx(-R). All other units are considered to have hazard energy level outputs.
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 30 A,
- The investigated Pollution Degree is: 2
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: The PWB is rated 130°C. ,
- The Normal Temperature Test for the Model i6A4W***A%%%V-0xx was performed with 500 LFM external cooling. The manufacture's datasheet should be consulted regarding derating when less external airflow is provided.
- The subject units are intended to be supplied from a SELV input.

**Additional Information**

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**Additional Standards**

The product fulfills the requirements of: -

**Markings and instructions**

| Clause Title | Marking or Instruction Details |
|---|---|
| 1.7.1 Power rating - Ratings | Optional, (voltage dc, current) |
| 1.7.1 Power rating - Company identification | Listee's or Recognized company's name, Trade Name, Trademark or File Number |
| 1.7.1 Power rating - Model | Model Number |

**Special Instructions to UL Representative**

Listee's or Recognized company's name, Trade Name (TDK-Lambda and/or TDK-Lambda Americas Inc), Trademark or File Number may be located on the unit or the smallest packaging. The rating of the unit is embedded as part of the part number.

**Production-Line Testing Requirements**

**Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.**

| Model | Component | Removable Parts | Test probe location | V rms | V dc | Test Time, s |
|---|---|---|---|---|---|---|
| N/A | | | | | | |

**Earthing Continuity Test Exemptions - This test is not required for the following models:**

All Models

**Electric Strength Test Exemptions - This test is not required for the following models:**

All Models

**Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:**

**Sample and Test Specifics for Follow-Up Tests at UL**

| Model | Component | Material | Test | Sample(s) | Test Specifics |
|---|---|---|---|---|---|
| N/A | | | | | |