UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12 (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:	Power Supply, DC-DC converter
Model:	iEH Series: iEH48025A120V-xxx(-R) iEH48028A108V-xxx(-R) iEH48020A120V-xxx(-R) iEH4N028A108V-xxx(-R) iEH4N033A096V-xxx(-R) iEH4N031A096V-xxx(-R) iEH4N040A120V-xxx(-R) iEH4N042A108V-xxx(-R) where xxx represents any alphanumeric characters denoting non-safety related features.
Rating:	iEH Series iEH48025A120V-xxx(-R) Input: 36-75Vdc (Special Application - TNV-2), 9A Output: 12Vdc, 25A, 300W max iEH48028A108V-xxx(-R) Input: 36-75Vdc (Special Application - TNV-2), 9A Output: 10.8Vdc, 28A, 300W max iEH48020A120V-xxx(-R) Input: 36-75Vdc (Special Application - TNV-2), 7.5A Output: 12Vdc, 20A, 240W max iEH4N028A108V-xxx(-R) Input: 51-55Vdc, 6.5A Output: 10.8Vdc, 28A, 302W max iEH4N033A096V-xxx(-R) Input: 38-55Vdc, 8.5A Output: 9.6Vdc, 33.3A, 320W max iEH4N031A096V-xxx(-R) Input: 38-55Vdc, 8A Output: 9.6Vdc, 31.3A, 300W max

	iEH4N040A120V-xxx(-R) Input: 49-56Vdc, 10.5A Output: 12Vdc, 40A, 480W IEH4N042A108V-xxx(-R) Input: 49-56Vdc, 9.8A Output: 10.8Vdc, 42A, 454W
Applicant Name and Address:	TDK-LAMBDA AMERICAS INC SUITE 100 3320 MATRIX DR RICHARDSON TX 75082 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: LaTanya Schwalb Reviewed by: Dave Piecuch

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 is a component type DC to DC power module with a planar power transformer. 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. These models have been evaluated as having Basic insulation from input to output. The product employs a multilayer PWB planar transformer.

Model Differences

All models within the iEH Series employ identical mechanical configuration, using the same PWB, same transformer winding turns ratio, same transformer core set, and inductor core set. The house-keeping transformers used for the bias supply, current sensing, and gate drive purposes are also the same for all models within the series.

The iEH 480W series (Models iEH4N040A120V-xxx and iEH4N042A108V-xxx) is identical in construction to the iEH 300W/320W series described above, except for the PWB board copper weight, the output inductor used, and the base plate incorporates heat sink pin fins.

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) : 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 : Special Application - TNV-2 for units with a 75Vdc input; SELV for units with a 56Vdc input
- Considered current rating of protective device as part of the building installation (A) : 20 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
- The means of connection to the mains supply is: not provided; units are intended for building-in.
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual

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: All
- The following secondary output circuits are at hazardous energy levels: All
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- The following end-product enclosures are required: Fire, Mechanical, Electrical
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: Heating Test is to be considered during the end product evaluation. PWB is rated 130°C.
- The maximum continuous power supply output (Watts) relied on forced air cooling from: testing was conducted for the 300W series in a wind tunnel with forced air cooling set to 400LFM with a unit output loaded to max rated Load of 300W max, Fan Distance from Unit: ~65 cm, Fan Location: Above unit, Air-flow Direction: unit is in input left orientation, airflow is flowing upwards in this orientation., , The maximum continuous power supply output (Watts) for the iEH 480W series relied on forced air cooling: testing was conducted in a wind tunnel with forced air cooling set to 60LFM with a unit output loaded to max rated Load of 480W max, Fan Distance from Unit: ~65 cm, Fan Location: Above unit, Air-flow Direction: transverse (airflow from Pin1 to Pin 3)
- The power DC-DC Converter is intended to be supplied by an isolated secondary circuit in the end-use application.
- The input of the iEH Series of DC to DC Converters (rated 36-75Vdc) was considered to be Special Application - TNV-2 due to the 75Vdc input rating, for the purpose of applying Basic Insulation requirements only. Consideration should be given to the above in the end-use product.

Additional Information

The products may optionally provide a suffix [R] which indicates a non-safety related function.

Additional Standards

The product fulfills the requirements of: -

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	

	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number

Special Instructions to UL Representative

Listee's or Recognized company's name, Trade Name, 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 model/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

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