UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) 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:	AC-DC Power Converter Module
Model:	PFH500F-28- xxx-R, PFH500F-48-xxx-R, PFH500F-12-xxx-R, PFH500S-28- xxx-R, PFH500S-48-xxx-R and PFH500S-12-xxx-R where xxx can be any alphanumeric character or blank representing non-safety critical options such as pin length, mounting style, control function, etc.
Rating:	PFH500F-28- xxx-R, PFH500S-28- xxx-R: Input: 100-240Vac, 8A, 50/60 Hz Output: 28Vdc, 18A, 504W max. PFH500F-48- xxx-R, PFH500S-48- xxx-R: Input: 100-240Vac, 7A, 50/60 Hz Output: 48Vdc, 10.5A, 504W max. PFH500F-12- xxx-R, PFH500S-12-xxx-R: Input: 100-240Vac, 7.5A, 50/60 Hz Output: 12Vdc, 42A, 504W max.
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: Gregory Ray Reviewed by: Dean Baker

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 units are Building-in type AC-DC power converter modules filled with insulating compound.

Model Differences

Each model is identical, except for model designation, output rating, and secondary winding of main Transformer.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : not directly connected to the mains
- Operating condition : continuous
- Access location : N/A (unit intended for building-in)
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Not classified
- Considered current rating of protective device as part of the building installation (A) : N/A (External 10A Listed fuse specified in user manual)
- Pollution degree (PD) : 2
- IP protection class : IP X0
- Altitude of operation (m) : less than 2000 meters
- Altitude of test laboratory (m) : less than 2000 meters
- 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 product is intended for use on the following power systems: TN
- Refer to Miscellaneous Enclosure ID 7-01 for derating curve based on Case temperature.

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 Production-Line tests are conducted for this product: Electric Strength as follows: 3000Vac input to output, 2500Vac input to case and 1500Vdc output to case
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 259 Vrms, 556 Vpk
- The following secondary output circuits are SELV: All outputs
- The following secondary output circuits are at hazardous energy levels: All
- The power supply terminals and/or connectors are: Not investigated for field wiring
- The investigated Pollution Degree is: 2
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): T2 (Class B)
- Tests were conducted with external fusing as follows: Listed fuse by Littelfuse, 312-010, Fast Acting Fuse, 10A / 250V and Listed inrush resistor by Uchihashi, ASMC-220J, Thermal Cutoff Resistor, 22ohm / 139°C. Additionally testing was performed with 11.5cm x 11.5cm x 3.5cm tall pin fin heatsink attached to PFH module and external fan by Minebea Matsushita Motor Corp - model #3110KL-04WB30, 12VDC (fan voltage was set at 3.5V with airflow measuring roughly ~30 LFM) to cool the heatsink.
- Units were evaluated for reinforced insulation, 3000Vac between primary/secondary, primary/case and secondary/case. Additionally the units were evaluated as basic/supplemental insulation between the case and primary (input) at 2500Vac and the case and secondary (output) at 1500Vac. The case is considered as floating.

Additional Information

N/A

Markings and instructions

Clause Title	Marking or Instruction Details

Special Instructions to UL Representative

N/A

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:

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					