UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CSA C22.2 No. 62368-1-14, 2nd Ed., Issue Date: 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	Open type Switching Mode Power Supply
Model:	PF(x)1500(XX)-YZ-UVW-R, PF(x)1800(XX)-YZ-UVW-R Where "(x)" denotes any alphanumeric character not impacting safety Where "(XX)" denotes feature set (Full or Simple) Where "YZ" denotes Output Voltage Where "UVW' denotes an optional code for non safety related features Where "R" denotes ROHS compliance
Rating:	Model PF(x)1500(XX)-YZ-UVW-R: Input: 100V – 277 VAC, 14A, 50/60Hz Output: 24-60VDC, 62.5A max., Max 1500 Watt. Model PF(x)1800(XX)-YZ-UVW-R: Input: 100/277 VAC, 16A, 50/60Hz Output: 24-60VDC, 64.3A max., Max 1800 Watt.
Applicant Name and Address:	TDK-LAMBDA AMERICAS INC 3000 TECHNOLOGY DR, SUITE 100 PLANO TX 75074 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: Edward Martin / Project Handler Reviewed By: Michael Lockhart / Reviewer

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 tested is an open frame Build-in type Switching Class II Power Supply for end product use (host equipment is not specified). The PFH product family consists of high density AC-DC power converter modules intended to be used as a component in an end-user's power system.

The PFH1500, and PFH1800 product is available in one mechanical configuration using the same transformer core set, the same input PFC (Power Factor Correction) inductor core set, and the same output filter inductor core set with the same geometry except for the air gap and number of turns used in the output inductor. Aluminum baseplate is used for mounting the power components and is completely potted.

Model Differences

All models within this report are identical, except for model designation, output rating, and secondary winding of main Transformer. PF(x)1500(XX)-YZ-UVW-R is identical to PF(x)1800(XX)-YZ-UVW-R except for output power rating of 1500W and 1800W respectively.

Example models:

PFH1500F-48-xxx-R

PFH1500F-60-xxx-R

PFH1500F-28-xxx-R

"x" denotes an optional code for non safety related features.

Test Item Particulars

Classification of use by ..... :	Instructed person
Supply Connection..... :	AC Mains
Supply % Tolerance ..... :	+10%/-10%
Supply Connection – Type ..... :	for building-in
Considered current rating of protective device as part of building or equipment installation ..... :	20 (The power modules are not internally fused. An external input line fast-acting fuse with a maximum value of 20 A is required.) A; building;
Equipment mobility ..... :	for building-in

Over voltage category (OVC)	:	OVC II
Class of equipment	:	Class II
Access location	:	N/A
Pollution degree (PD)	:	PD 2
Manufacturer's specified maximum operating ambient (°C)	:	Base plate not exceeding 100C
IP protection class	:	IPX0
Power Systems	:	TN
Altitude during operation (m)	:	Up to 3000 m
Altitude of test laboratory (m)	:	2000 m or less
Mass of equipment (kg)	:	<1Kg

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : baseplate not exceeding 85C at 1800W output and 100C at 1500W output
- The product is intended for use on the following power systems : For building in
- Considered current rating of protective device as part of the building installation (A) : 20 (The power modules are not internally fused. An external input line fast-acting fuse with a maximum value of 20 A is required.)
- Mains supply tolerance (%) or absolute mains supply values : +10%/-10%
- The equipment disconnect device is considered to be : N/A. For building in.
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standards : UL/CSA 62368-1 2nd Edition, , EN 62368-1:2014 + A11:2017

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 product-line tests are conducted for this product : Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of : Primary-Secondary: 343.2 Vrms/ 651 Vpk
- The following output circuits are at ES1 energy levels : Output Connectors under normal
- The following output circuits are at ES2 energy levels : Output Connectors under single fault
- The following output circuits are at PS3 energy levels : Output
- The maximum investigated branch circuit rating is : 20 (The power modules are not internally fused. An external input line fast-acting fuse with a maximum value of 20 A is required.)
- The investigated Pollution Degree is : 2
- An investigation of the protective bonding terminals has : not been conducted
- The following end-product enclosures are required : Electrical, Fire
- 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) : Bias Transformer
- The power supply was evaluated to be used at altitudes up to : "3,000 m"
- The end-use product shall ensure that the power supply is used within its ratings.
- Temperature, Leakage Current, Capacitor Discharge, and Dielectric Voltage Withstand should be considered as part of the end product evaluation.
- End product application shall consider the need for different orientations of installation during testing.
- The acceptability of risk in conjunction to the routing of wires away from moving parts and sharp edges as part of the power supply shall be evaluated in the end application.

Additional Information

Amendment 2 (Administrative) to CB Test report E220248-A6035-CB-1: In the previous amendment, the report incorrectly listed a single output voltage due to an engineering oversight. The rated output voltage has now been updated to correctly reflect: 24–60 VDC. No testing was conducted as part of this Amendment. This Amendment is not valid without the original CB test report.

Amendment 1 (Technical) to E220248-A6035-CB-1: Limited testing deemed necessary to add model PF(x)1800(XX)-YZ-UVW-R. New model is identical to previous except for increased output rating. Additionally administrative change to model nomenclature for model PFH1500X-YZ-UVW-R to change to PF(x)1500(XX)-YZ-UVW-R, with the added placeholders being for marketing purposes only.

Product must be needed the following external components of the circuit functions:
- Input Fuse (Client recommendation provided as part of spec sheet)
- Input Filter

All original sample and test dates are noted in the testing portion of this report.

The nameplate included in the report is representative of all models covered under this report.

Additional Standards

The product fulfills the requirements of: AS/NZS 62368.1:2018,
EN 62368-1:2014+A11:2017,
J62368-1 (2020),
CSA/UL 62368-1:2014

Markings and Instructions

Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listee’s or Recognized companys name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	"Input Ratings (voltage, frequency/dc, current/power)", "Output Ratings (voltage, frequency/dc, current/power)"

Special Instructions to UL Representative

Units can be fully manufactured in either the Malaysia or Plano, TX location; however, it is also possible that completed units can go back to either factory for rework where a new product label can be applied based on the location that completed the rework.

The Field Inspector should verify that the reworked units came from the original manufacturer (the Factory ID (if any) should be verified). The Field Inspector should verify that the new product label includes all required markings as shown in the Markings and Instructions section.