



Test Report issued under the responsibility of:



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Precisely Right.

**TEST REPORT**  
**IEC 62368-1**  
**Audio/video, information and communication technology equipment**  
**Part 1: Safety requirements**

**Report Number**..... : 31382547.400  
**Date of issue**..... : November 11, 2022  
**Total number of pages**..... : 104 + Attachments

**Name of Testing Laboratory preparing the Report** ..... : TÜV Rheinland of North America, Inc.  
1279 Quarry Lane, Ste. A, Pleasanton, CA 94566 USA

**Applicant's name** ..... : TDK-Lambda Americas Inc.  
**Address**..... : 401 Mile of Cars Way, Suite 325, National City, CA, 91950 USA

**Test specification:**  
**Standard**..... : IEC 62368-1:2018  
**Test procedure**..... : CB Scheme  
**Non-standard test method**..... : N/A

**TRF template used**..... : IECEE OD-2020-F1:2021, Ed.1.4  
**Test Report Form No.**..... : IEC62368\_1E  
**Test Report Form(s) Originator** ... : UL(US)  
**Master TRF**..... : Dated 2022-04-14

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**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

**General disclaimer:**  
The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

<b>Test item description</b> .....	Switch Mode Power Supply
<b>Trade Mark(s)</b> .....	<b><i>TDK-Lambda</i></b>
<b>Manufacturer</b> .....	Same as applicant
<b>Model/Type reference</b> .....	1) CPFE1000Fi-12/xy, 2) CPFE1000Fi-28/xy, 3) CPFE1000Fi-48/xy (x = blank, /C, /P, /H; y = Blank, /H)
<b>Ratings</b> .....	Input: 1) AC 100–240V, 50–60Hz, 12A; 2),3) AC 100–240V, 50–60Hz, 16A  Output: 1) 9.6–14.4Vdc, 60A, 720W; 2) 22.4–33.6Vdc, 36A, 1008W; 3) 38.4–57.6Vdc, 21A, 1008W

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input type="checkbox"/>	CB Testing Laboratory:	TUV Rheinland of North America, Inc
Testing location/ address..... :		1279 Quarry Lane, Ste. A, Pleasanton, CA 94566 USA
Tested by (name, function, signature)..... :		
Approved by (name, function, signature) . :		
<hr/>		
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	N/A
Testing location/ address..... :		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature) . :		
<hr/>		
<input checked="" type="checkbox"/>	Testing procedure: CTF Stage 2:	TDK-Lambda Americas Inc
Testing location/ address..... :		401 Mile of Cars Way, Suite 325, National City, CA, 91950 USA
Tested by (name, function, signature).....		Anthony Villasenor/ Product Safety Engineer <i>A Villasenor</i>
Witnessed by (name, function, signature) :		Dan Aquino/ Senior Test Engineer <i>[Signature]</i>
Approved by (name, function, signature) . :		Arun Kumar/ Senior Test Engineer <i>[Signature]</i>
<hr/>		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	N/A
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	N/A
Testing location/ address..... :		
Tested by (name, function, signature)..... :		
Witnessed by (name, function, signature) :		
Approved by (name, function, signature) . :		
Supervised by (name, function, signature):		

<p><b>List of Attachments (including a total number of pages in each attachment):</b></p> <p>Attachment 1: National Differences (38 pages)</p> <p>Attachment 2: Photographs (2 pages)</p> <p>Attachment 3: Schematic (2 pages)</p> <p>Attachment 4: PCB Layouts (2 pages)</p> <p>Attachment 5: Power Supply CB Certificate (2 pages)</p>	
<p><b>Summary of testing:</b></p> <p>The test data was taken from the TUV CB report 31382547.001 which is in accordance with IEC 60950-1 and TUV CB Report 31382547.300 which is accordance with IEC 62368-1, 2<sup>nd</sup> Edition</p> <p>The product was tested on a bench top with full load which drew the output power to the max. rated value. Refer to body of report and appended tables for details of each test.</p>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>Report No. 31382547.400: No testing required</p> <p>Report No. 31382547.300: Input Test (B.2.5) Electrical Strength Test (5.4.9) Safeguards Against Capacitor Discharge after Disconnection of a Capacitor (5.5.2.2) Touch Current Test (5.7.2) Simulated single fault conditions (B.4) Maximum operating temperatures for materials, components and systems (5.4.1.4, 6.3.2, 9.0, B.2.6) Limited Power Source (Q.1) Simulated Abnormal operating condition tests (B.3)</p> <p>Report No. 31382547.001: Input Test (B.2.5) Safeguards Against Capacitor Discharge after Disconnection of a Capacitor (5.5.2.2) Resistance of the protective bonding system (5.6.6) Maximum operating temperatures for materials, components and systems (5.4.1.4, 6.3.2, 9.0, B.2.6) Touch Current Test (5.7.2) Electrical Strength Test (5.4.9) Simulated single fault conditions (B.4) Simulated Abnormal operating condition tests (B.3) Power Supply Output Short-Circuit/ Overload Test (5.3.7)</p>	<p><b>Testing location:</b></p> <p>TDK-Lambda Americas, Inc. 401 Mile of Cars Way, Suite 325 National City, CA 91950</p> <p>TDK-Lambda Americas, Inc. 401 Mile of Cars Way, Suite 325 National City, CA 91950</p>

**Summary of compliance with National Differences (List of countries addressed):**

EU group differences, Canada and United States, Australia /New Zealand.

- The product fulfils the requirements of EN IEC 62368-1:2020+A11:2020.
- The product fulfils the requirements of CAN/CSA C22.2 No. 62368-1:2019.
- The product fulfils the requirements of UL 62368-1:2019
- The product fulfils the requirements of AS/NZS 62368.1:2022.

**Use of uncertainty of measurement for decisions on conformity (decision rule) :**

No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

Other: (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

**Information on uncertainty of measurement:**

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

**TDK-Lambda** MODEL No.: **CPFE1000Fi-12**

INPUT: 100-240 V (~), 12A, 50-60 HZ  
 INPUT POWER : 1000W MAX.  
 DC OUTPUT POWER: 720W MAX.  
 9.6-14.4 VDC (==) @ 60A MAX.

SEE MANUAL FOR CONNECTIONS AND OTHER INPUT/OUTPUT DE-RATING INFORMATION

REV. X1

MADE IN XXXXXXXX CLV-XXXXXX-FFFF SWWY

**TDK-Lambda** MODEL No.: **CPFE1000Fi-28**

INPUT: 100-240 V (~), 16A, 50-60 HZ  
 INPUT POWER : 1300W MAX.  
 DC OUTPUT POWER: 1008W MAX.  
 22.4-33.6 VDC (==) @ 36A MAX.

SEE MANUAL FOR CONNECTIONS AND OTHER INPUT/OUTPUT DE-RATING INFORMATION

REV. X1

MADE IN XXXXXXXX CLV-XXXXXX-FFFF SWWY

**TDK-Lambda** MODEL No.: **CPFE1000Fi-48**

INPUT: 100-240 V (~), 16A, 50-60 HZ  
 INPUT POWER : 1300W MAX.  
 DC OUTPUT POWER: 1008W MAX.  
 38.4-57.6 VDC (==) @ 21A MAX.

SEE MANUAL FOR CONNECTIONS AND OTHER INPUT/OUTPUT DE-RATING INFORMATION

REV. X1

MADE IN XXXXXXXX CLV-XXXXXX-FFFF SWWY

Test item particulars:			
<b>Product group</b> .....	<input type="checkbox"/> end product	<input checked="" type="checkbox"/> built-in component	
<b>Classification of use by</b> .....	<input type="checkbox"/> Ordinary person	<input type="checkbox"/> Children likely present	
	<input checked="" type="checkbox"/> Instructed person		
	<input checked="" type="checkbox"/> Skilled person		
<b>Supply connection</b> .....	<input checked="" type="checkbox"/> AC mains	<input type="checkbox"/> DC mains	
	<input type="checkbox"/> not mains connected:		
	<input type="checkbox"/> ES1	<input type="checkbox"/> ES2	<input checked="" type="checkbox"/> ES3
<b>Supply tolerance</b> .....	<input checked="" type="checkbox"/> +10%/-10%		
	<input type="checkbox"/> +20%/-15%		
	<input type="checkbox"/> + %/ - %		
	<input type="checkbox"/> None		
<b>Supply connection – type</b> .....	<input type="checkbox"/> pluggable equipment type A -		
	<input type="checkbox"/> non-detachable supply cord		
	<input type="checkbox"/> appliance coupler		
	<input type="checkbox"/> direct plug-in		
	<input type="checkbox"/> pluggable equipment type B -		
	<input type="checkbox"/> non-detachable supply cord		
	<input type="checkbox"/> appliance coupler		
	<input type="checkbox"/> permanent connection		
	<input type="checkbox"/> mating connector	<input checked="" type="checkbox"/> other: Building In	
<b>Considered current rating of protective device</b> .....	<input checked="" type="checkbox"/> 20 A;		
	Location:	<input checked="" type="checkbox"/> building	<input type="checkbox"/> equipment
	<input type="checkbox"/> N/A		
<b>Equipment mobility</b> .....	<input type="checkbox"/> movable	<input type="checkbox"/> hand-held	<input type="checkbox"/> transportable
	<input type="checkbox"/> direct plug-in	<input type="checkbox"/> stationary	<input checked="" type="checkbox"/> for building-in
	<input type="checkbox"/> wall/ceiling-mounted	<input type="checkbox"/> SRME/rack-mounted	
	<input type="checkbox"/> other:		
<b>Overvoltage category (OVC)</b> .....	<input type="checkbox"/> OVC I	<input checked="" type="checkbox"/> OVC II	<input type="checkbox"/> OVC III
	<input type="checkbox"/> OVC IV	<input type="checkbox"/> other:	
<b>Class of equipment</b> .....	<input checked="" type="checkbox"/> Class I	<input type="checkbox"/> Class II	<input type="checkbox"/> Class III
	<input type="checkbox"/> Not classified	<input type="checkbox"/>	
<b>Special installation location</b> .....	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> restricted access area	
	<input type="checkbox"/> outdoor location	<input type="checkbox"/>	
<b>Pollution degree (PD)</b> .....	<input type="checkbox"/> PD 1	<input checked="" type="checkbox"/> PD 2	<input type="checkbox"/> PD 3
<b>Manufacturer's specified T<sub>ma</sub></b> .....	70°C	<input type="checkbox"/> Outdoor: minimum	°C
<b>IP protection class</b> .....	<input checked="" type="checkbox"/> IPX0	<input type="checkbox"/> IP__	
<b>Power systems</b> .....	<input checked="" type="checkbox"/> TN	<input type="checkbox"/> TT	<input type="checkbox"/> IT - V <sub>L-L</sub>
	<input type="checkbox"/> not AC mains		
<b>Altitude during operation (m)</b> .....	<input type="checkbox"/> 2000 m or less	<input checked="" type="checkbox"/> 3000 m	
<b>Altitude of test laboratory (m)</b> .....	<input type="checkbox"/> 2000 m or less	<input checked="" type="checkbox"/> 3000 m	
<b>Mass of equipment (kg)</b> .....	0.5 kg		

<b>Possible test case verdicts:</b>	
- test case does not apply to the test object....: N/A	
- test object does meet the requirement .....: P (Pass)	
- test object does not meet the requirement....: F (Fail)	
<b>Testing:</b>	
Date of receipt of test item .....	N/A (Report 31382547.400) 12/28/2020 (31382547.300) 09/11/2013 (31382547.001)
Date (s) of performance of tests.....	N/A (Report 31382547.400) 12/28/2020 (31382547.300) 09/11/2013 – 09/18/2013 (31382547.001)
<b>General remarks:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.  "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> <p><input type="checkbox"/> This Test Report Form contains requirements according to IEC/ISO ..... Standard dated ..... and includes Corrigendum dated .....</p> <p>(Note: The above text maybe removed if not applicable)</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC/ISO 2:</b>	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
<b>When differences exist; they shall be identified in the General product information section.</b>	
Name and address of factory (ies).....	TDK-Lambda Malaysia Sdn. Bhd. PLO33 Kawasan Perindustrian Senai 81400 Senai, Malaysia
<b>General product information and other remarks:</b>	
<p>The product is a Class I switching type AC/DC power supply. The constructions of all the models are identical except for the output resistance values. Model Nomenclature: Where X maybe blank, /C, /P or /H; Y maybe blank or /H, where blank indicates "with U channel", C indicates "with Cover", P indicates "No U channel" and H indicates "with Conformal coating".</p>	



**Conditions of Acceptability:**

The units are considered to operate under the conditions of:

- Pollution Degree 2 environment
- Equipment Mobility: Component for building-in
- Class of Equipment: Class I

1. These products can be used in any orientation providing the baseplate temperature does not exceed 85°C. See output rating below.
2. The input and output connectors are not acceptable for use as field wiring terminals.
3. The baseplate must be properly bonded to the main protective earthing contact in the end use equipment.
4. Fire enclosure requirement must be addressed in the end use equipment.
5. Re-evaluation of the heating, dielectric and bonding tests need to be conducted in the end use equipment.
6. Suitability of enclosure shall be provided in the end use equipment. 7.
7. Short-circuit back-up protection in accordance with clause 2.7.3 shall be evaluated in the end-use equipment.

**Report History:**

Report 31382547.400 – Original CB report evaluation to IEC 62368-1:2018, 3rd Edition

Report 31382547.300 – Original CB report evaluation to IEC 62368-1:2014, 2nd Edition

Report 31382547.001 - Original CB report evaluation to IEC 60950-1:2005+A1+A2

<b>OVERVIEW OF ENERGY SOURCES AND SAFEGUARDS</b>				
<b>Clause</b>	<b>Possible Hazard</b>			
5	Electrically-caused injury			
Class and Energy Source (e.g. ES3: Primary circuit)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
Instructed/Skilled Person	ES3: primary circuit	End-Product Equipment Enclosure	End-Product Earth	Insulation/ End-Product Enclosure
Instructed/Skilled Person	ES1: power supply output	End-Product Equipment Enclosure	End-Product Earth	Insulation/ End-Product Enclosure
6	Electrically-caused fire			
Class and Energy Source (e.g. PS2: 100 Watt circuit)	Material part (e.g. Printed board)	Safeguards		
		B	1 <sup>st</sup> S	2 <sup>nd</sup> S
Input	PS3: Mains circuits	Components and selection of materials	End-Product Equipment Enclosure	Insulation/ End-Product Enclosure
Output	PS3: Output	Components and selection of materials	End-Product Equipment Enclosure	Insulation/ End-Product Enclosure
Output circuit, J2	PS2: Output	Components and selection of materials	End-Product Equipment Enclosure	Insulation/ End-Product Enclosure
7	Injury caused by hazardous substances			
Class and Energy Source (e.g. Ozone)	Body Part (e.g., Skilled)	Safeguards		
		B	S	R
No hazardous substances present in the product.	N/A	-	-	-
8	Mechanically-caused injury			
Class and Energy Source (e.g. MS3: Plastic fan blades)	Body Part (e.g. Ordinary)	Safeguards		
		B	S	R
Ordinary	MS1: Mass of Equipment	End-Product Equipment Enclosure	-	-
Ordinary	MS1: Sharp Edges	End-Product Equipment Enclosure	-	-
9	Thermal burn			
Class and Energy Source (e.g. TS1: Keyboard caps)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
Ordinary	TS1: Accessible surfaces	End-Product Equipment Enclosure	-	-

10	Radiation			
Class and Energy Source (e.g. RS1: PMP sound output)	Body Part (e.g., Ordinary)	Safeguards		
		B	S	R
No ionizing radiation produced in the product.	-	-	-	-
Supplementary Information: "B" – Basic Safeguard; "S" – Supplementary Safeguard; "R" – Reinforced Safeguard				

**ENERGY SOURCE DIAGRAM**

**Optional.** Manufacturers are to provide the energy sources diagram identify declared energy sources and identifying the demarcations are between power sources. Recommend diagram be provided included in power supply and multipart systems.

Insert diagram below. Example diagram designs are; Block diagrams; image(s) with layered data; mechanical drawings

