



Test Report issued under the responsibility of:



TEST REPORT

IEC 62368-1

Audio/video, information and communication technology equipment

Part 1: Safety requirements

Report Number	31081075.300
Date of issue	February 4, 2020
Total number of pages	75 pages + Attachments

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

Test specification:

Standard	IEC 62368-1:2014 (Second Edition)
Test procedure	CB Scheme
Non-standard test method	N/A

Test Report Form No.	IEC62368_1B
Test Report Form(s) Originator	UL(US)
Master TRF	2014-03

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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.
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Test Item description	Switch Mode Power Supply	
Trade Mark	TDK-Lambda	
Manufacturer.....	Same as applicant	
Model/Type reference	1) CPFE 1000F-12, 2) CPFE 1000F-28, 3) CPFE 1000F-48	
Ratings	Input: 100–240V, 50–60Hz (Operating Range 85–265V, 47–63Hz), 12A (CPFE 1000F-12) / 16A (CPFE 1000F-28, CPFE 1000F-48) Output: 1) 9.6–14.4 (12) Vdc, 60 A, 720 W max 2) 22.4–33.6 (28) Vdc, 36 A, 1008 W max 3) 38.4–57.6 (48) Vdc, 21 A, 1008 W max	
Testing procedure and testing location:		
<input type="checkbox"/> CB Testing Laboratory:	TUV Rheinland of North America, Inc.	
Testing location/ address	1279 Quarry Lane, Ste. A, Pleasanton, CA 94566 USA	
<input type="checkbox"/> Associated CB Testing Laboratory:		
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature).....		
Testing procedure: TMP/CTF Stage 1		
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature).....		
<input checked="" type="checkbox"/> Testing procedure: WMT/CTF Stage 2	TDK-Lambda Americas, Inc	
Testing location/ address	401 Mile of Cars Way, Suite 325 National City, CA 91950	
Tested by (name + signature)	Anthony Villasenor	<i>A Villasenor</i>
Witnessed by (name + signature)	Dan Aquino	<i>Dan Aquino</i>
Approved by (name + signature).....	Chan Wang	<i>Chan Wang</i>
Testing procedure: SMT/CTF Stage 3 or 4		
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature).....		
Supervised by (name + signature)		

<p>List of Attachments (including a total number of pages in each attachment):</p> <p>Attachment 1: National Differences (37 pages) Attachment 2: Photos (6 pages) Attachment 3: Schematics (1 page) Attachment 4: PWB Component Layout (1 page) Attachment 5: Power Supply CB Certificates (2 pages)</p>	
<p>Summary of testing:</p> <p>The test data was taken from the TUV CB report 31081075.001 which is in accordance with IEC 60950-1.</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>Tests performed (name of test and test clause):</p> <p><u>31081075.300</u> 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><u>31081075.001</u> 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>Testing location:</p> <p><u>31081075.300</u> TDK-Lambda Americas, Inc. 401 Mile of Cars Way, Suite 325 National City, CA 91950</p> <p><u>31081075.001</u> 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, EU Special National Conditions, CA, DK, US, AU, NZ, IT, JP

Explanation of used codes: CA = Canada, DK = Denmark, US = United States of America, AU = Australia, NZ = New Zealand, IT = Italy, JP = Japan

The product fulfils the requirements of EN 62368-1:2014+A11:2017.



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.: CPFE1000F-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,
 100°C MAX. BASEPLATE TEMP.]

INPUT
 ACL
 GND
 ACN


 SEE MANUAL FOR CONNECTIONS AND OTHER INPUT INFORMATION
 REV. P2

 XXXXXXXXXXXXX

AUX SIGNALS
 1 +SENSE
 2 -SENSE
 3 COM
 4 ON/OFF (RTN)
 5 ON/OFF (+)
 6 AUX
 7 CURRENT SHARE
 8 TRN
 9 ENA
 10 IIG



-V

+V

TDK-Lambda
MODEL No.: CPFE1000F-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,
 100°C MAX. BASEPLATE TEMP.]

INPUT
 ACL
 GND
 ACN


 SEE MANUAL FOR CONNECTIONS AND OTHER INPUT INFORMATION
 REV. P2

 XXXXXXXXXXXXX

AUX SIGNALS
 1 +SENSE
 2 -SENSE
 3 COM
 4 ON/OFF (RTN)
 5 ON/OFF (+)
 6 AUX
 7 CURRENT SHARE
 8 TRN
 9 ENA
 10 IIG



-V

+V

TDK-Lambda
MODEL No.: CPFE1000F-48

[INPUT: 100-240 V (-), 16A, 50-60 HZ
 INPUT POWER: 1300W MAX,
 DC OUTPUT POWER: 1008W MAX,
 33.4-57.6 VDC (---) @ 21A MAX,
 100°C MAX. BASEPLATE TEMP.]

INPUT
 ACL
 GND
 ACN


 SEE MANUAL FOR CONNECTIONS AND OTHER INPUT INFORMATION
 REV. P2

 XXXXXXXXXXXXX

AUX SIGNALS
 1 +SENSE
 2 -SENSE
 3 COM
 4 ON/OFF (RTN)
 5 ON/OFF (+)
 6 AUX
 7 CURRENT SHARE
 8 TRN
 9 ENA
 10 IIG

-V

+V

TEST ITEM PARTICULARS:	
Classification of use by	<input type="checkbox"/> Ordinary person <input checked="" type="checkbox"/> Instructed person <input checked="" type="checkbox"/> Skilled person <input type="checkbox"/> Children likely to be present
Supply Connection.....	<input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Mains <input type="checkbox"/> External Circuit - not Mains connected - <input type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input checked="" type="checkbox"/> ES3
Supply % Tolerance	<input checked="" type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> +____%/ -____% <input type="checkbox"/> None
Supply Connection – Type	<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"/> mating connector <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input type="checkbox"/> other: _____
Considered current rating of protective device as part of building or equipment installation.....	Not relying on protective device as part of the building installation, power supply has 90A circuit breakers for overcurrent protection. Installation location: <input checked="" type="checkbox"/> building; <input type="checkbox"/> equipment
Equipment mobility	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in <input type="checkbox"/> rack-mounting <input type="checkbox"/> wall-mounted
Over voltage category (OVC)	<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: _____
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III
Access location	<input type="checkbox"/> restricted access location <input checked="" type="checkbox"/> N/A Operator Accessible.
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified maximum operating ambient:	60°C
IP protection class	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP____
Power Systems	<input checked="" type="checkbox"/> TN <input type="checkbox"/> TT <input type="checkbox"/> IT - ____ V _{L-L}
Altitude during operation (m)	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 3000 m
Altitude of test laboratory (m)	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 3000 m
Mass of equipment (kg)	<input checked="" type="checkbox"/> 2.4 kg
POSSIBLE TEST CASE VERDICTS:	
- 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)
TESTING:	
Date of receipt of test item..... :	12/28/2020 (31081075.300) 05/24/2010 (31081075.001)
Date (s) of performance of tests	12/28/2020 (31081075.300) 05/24/2010-05/27/2010 (31081075.001)
GENERAL REMARKS:	
<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>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60068-2-1:	
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 checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) :	TDK-LAMBDA MALAYSIA SDN BHD PLO33 Kawasan Perindustrian Senai 81400 Senai, Malaysia

GENERAL PRODUCT INFORMATION:**Product Description:**

The equipment is a switch-mode power supply. All models are constructionally equivalent from a safety-critical standpoint and differ only in output voltage and current due to variations in output resistance values.

Conditions of Acceptability:

1. The units are considered to operate under the conditions of:
 - a. Pollution Degree 2 environment
 - b. Equipment mobility: Component for building-in.
 - c. Class of equipment: Class I
2. Model CPFE1000F-12 maximum ambient at 60°C from 85 to 265 V ac input (Max baseplate temperature: 85°C)
3. Models CPFE1000F-28 and CPFE1000F-48 maximum ambient at 60°C from 170 to 265 V ac input, linearly de-rated to 50°C at 85 V ac input. (Max baseplate temperature: 85°C at 170 to 265 V ac operation, 70°C below 170 V ac operation)
4. Fire enclosure requirements must be addressed in the end-use product.
5. Re-evaluation of the heating, dielectric, and bonding tests need to be conducted in the end-use product.
6. Short-circuit back-up protection in accordance with clause 2.7.3 shall be evaluated in end-use product.
7. Suitability of enclosure shall be provided in end product.
8. Power supply outputs are not investigated for limited power circuits

History of CB report:

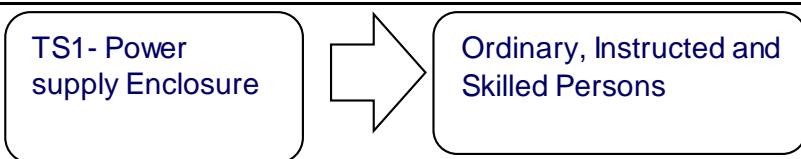
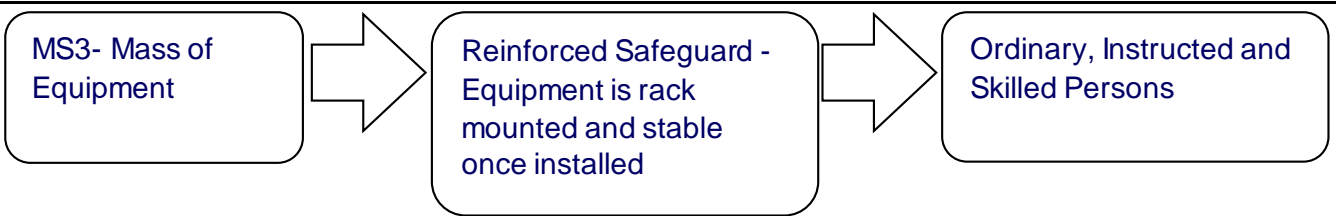
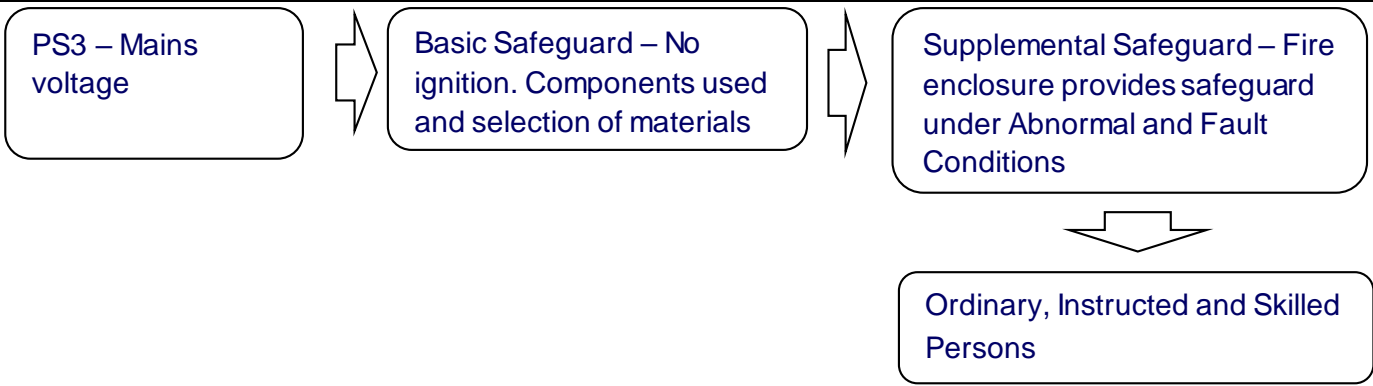
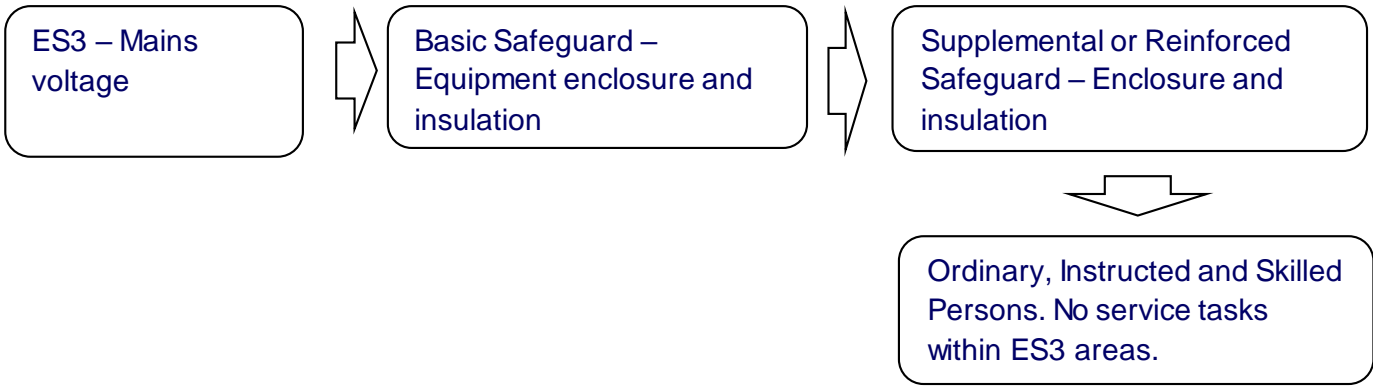
31081075.300 - Original IEC/EN 62368-1 CB report

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.)	
Electrically-caused injury (Clause 5): (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input	
	ES1
Source of electrical energy	Corresponding classification (ES)
Primary circuit	ES3
Output circuit	ES1
Electrically-caused fire (Clause 6): (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts):	
	PS2
Source of power or PIS	Corresponding classification (PS)
Power Supply Primary circuit	PS3
Power Supply Output circuit	PS3
Power Supply Output circuit, J2	PS2
Injury caused by hazardous substances (Clause 7) (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component	
	Glycol
Source of hazardous substances	Corresponding chemical
No hazardous substances present in the product.	N/A
Mechanically-caused injury (Clause 8) (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit	
	MS2
Source of kinetic/mechanical energy	Corresponding classification (MS)
Equipment Weight/Mass	MS3
Sharp Edges	MS1
Thermal burn injury (Clause 9) (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure	
	TS1
Source of thermal energy	Corresponding classification (TS)
Power Supply Enclosure	TS1
Radiation (Clause 10) (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product	
	RS1
Type of radiation	Corresponding classification (RS)
No ionizing radiation produced in the product.	N/A

ENERGY SOURCE DIAGRAM

Indicate which energy sources are included in the energy source diagram. Insert diagram below

ES PS MS TS RS



OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	Possible Hazard			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary	ES3: primary circuit	Enclosure	Earth	Insulation/ Enclosure
Ordinary	ES1: output circuit	Enclosure	Earth	Insulation/ Enclosure
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Input	PS3: Mains circuits	Components and selection of materials	Equipment Enclosure	Insulation/ Enclosure
Output	PS3: Output	Components and selection of materials	Equipment Enclosure	Insulation/ Enclosure
Output	PS2: Output, J2	Components and selection of materials	Equipment Enclosure	
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
No hazardous substances present in the product.	-	-	-	-
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary	MS3: Mass of Equipment	Enclosure	-	-
Ordinary	MS1: Sharp Edges	Enclosure	-	-
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary	TS1: Accessible surfaces	Enclosure	-	-
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
No ionizing radiation produced in the product.	-	-	-	-
Supplementary Information: (1) See attached energy source diagram for additional details. (2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				