

Test Report issued under the responsibility of:



TEST REPORT
IEC 60950-1
Information technology equipment – Safety –
Part 1: General requirements

Report Number.....: 1510046STO-001
Date of issue.....: 26 October 2015
Total number of pages..... 85 pages

Applicant's name.....: TDK-Lambda Corporation
Address.....: 2704-1 Settaya-machi, Nagaoka-shi, Niigata, 940-1195 JAPAN

Test specification:

Standard.....: IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
Test procedure.....: CB Scheme
Non-standard test method.....: N/A

Test Report Form No.....: IEC60950_1F
Test Report Form(s) Originator.....: SGS Fimko Ltd
Master TRF.....: Dated 2014-02

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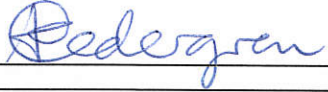
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General disclaimer:

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.

Table with 2 columns: Test item description, Trade Mark, Manufacturer, Model/Type reference, Ratings. Values include DC-DC Converters, TDK-Lambda, TDK-Lambda Corporation, PAF450F280-**, PAF600F280-**, DC 200-400V, 4A or DC 245-373V, 4A.

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Intertek Semko AB
Testing location/ address		Torshamnsgatan 43, P.O. Box 1103, SE-164 22 Kista, SWEDEN
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address		
Tested by (name + signature).....		Bedran Nergiz 
Approved by (name + signature)		Anna Karin Cedergren 
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:	
Testing location/ address		
Tested by (name + signature).....		
Approved by (name + signature)		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:	
Testing location/ address		
Tested by (name + signature).....		
Witnessed by (name + signature)		
Approved by (name + signature)		
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4:	
Testing location/ address		
Tested by (name + signature).....		
Witnessed by (name + signature)		
Approved by (name + signature)		
Supervised by (name + signature).....		

TRF No. IEC60950_1F

Summary of testing:	
Tests performed (name of test and test clause): See test report	Testing location: See page 2
Summary of compliance with National Differences: <input checked="" type="checkbox"/> The product fulfils the requirements of EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013. Group- and national differences for the CENELEC countries have been considered during the testing.	
Copy of marking plates: (examples) 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.	
	
	

Models included within the scope of this report				
Model	Input, DC		Output, DC	
	V	A _(typical)	V	A
PAF600F280-12	200-400	2.41	12	50
PAF600F280-24/KTH	245-373	3.20, 4(Max)	28	25
PAF600F280-24	200-400	2.35	24	25
PAF600F280-28	200-400	2.36	28	21.5
PAF600F280-48	200-400	2.35	48	12.5
PAF450F280-12	200-400	1.81	12	38
PAF450F280-24	200-400	1.79	24	19
PAF450F280-28	200-400	1.81	28	16.5
PAF450F280-48	200-400	1.79	48	9.5

The model listed above may include one or more of the suffix's as shown below.
 Suffix /T = No threads in the corner studs.
 The suffix "***" in the type designation is not safety related.

Test item particulars.....:	
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
Connection to the mains.....:	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input type="checkbox"/> not directly connected to the mains
Operating condition.....:	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	<input type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location <input checked="" type="checkbox"/> for building into a host equipment
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:
Mains supply tolerance (%) or absolute mains supply values	200-400Vdc, 245-373Vdc (See also page 7)
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V)	N/A
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (A)	16
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IPX0
Altitude during operation (m)	<2000
Altitude of test laboratory (m)	<2000
Mass of equipment (kg)	<0.250
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.....	See "General remarks" below
Date of receipt of test item.....	-
Date (s) of performance of tests.....	-
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. The test results and all data in this report are derived from previously issued Test Report No. 1017210 dated 1 July 2010, and Test Report No. 1218099 dated 29 August 2012, issued by Intertek Semko AB. A new report has been issued due to update of the standard IEC 60950-1, to include Am 2: 2013. No additional test has been conducted. 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 IEC 60950-1:			
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 factories..... : TDK-Lambda (Malaysia) Sdn. Bhd. PLO33 Locked Bag No. 110 Kawasan Perindustrian Senai 81400 Senai Johor, Darul Takzim, MALAYSIA TDK-Lambda Corporation Nagaoka Technical Center 2704-1 Settaya-machi, Nagaoka, Niigata 940-1195 JAPAN Wuxi TDK-Lambda Electronics Co., Ltd. No.6 Xing Chuang Er lu Wuxi Jiangsu, 214028 CHINA			
Abbreviations used in the report:			
- normal conditions	N.C.	- single fault conditions	S.F.C
- functional insulation	OP	- basic insulation	BI
- double insulation	DI	- supplementary insulation	SI
- between parts of opposite polarity	BOP	- reinforced insulation	RI
Indicate used abbreviations (if any)			

This Test Report replaces previously issued, see table below.

REVISION TABLE

Date	Report ref.	Clause	Modification of the appliance
26 October 2015	1510046STO-001	-	Basic Test Report

General Product Information:

These products have been assessed for Class 1, Pollution Degree 2, Material Group IIIB,

Overvoltage Category II, Altitude up to 2000 meters, maximum baseplate temperature 85°C.

- a) These products shall be installed in accordance with the requirements of IEC 60950-1:2005, EN 60950-1:2006, UL 60950-1/CSA C22.2 No. 60950-1:2007 for the end use application. The DC to DC converters were tested with a heatsink mounted below the baseplate of the device (worst case).
- b) These products must be installed in a restricted access location accessible to authorised competent personnel only. These products were assessed for reinforced insulation at working voltage between input and output. These converters may have a mains derived DC supply attached to the input and still provide a SELV output. All outputs are an energy hazard. To maintain the SELV output under fault conditions, the output must be connected to earth in the final application.
- c) The DC to DC converter baseplate shall be properly bonded to earth ground in the end use product as this unit was investigated for Class I construction. Basic insulation from primary to baseplate and secondary to baseplate is present. However to maintain SELV, the baseplate must be earthed.
- d) The operation of these DC to DC converters is subject to the end customer maintaining a maximum baseplate temperature of:-
PAF600F280. 85°C at 100% load and 100°C at 80% load
PAF450F280. 100°C at 100% load.
PAF600F280-24/KTH:- 70°C at 100% load, 75°C at 80% load, 90°C at 30% load in accordance with the de-rating curve included within the specification for this model
- e) The input and output connectors are not acceptable for field wiring connections and are only intended for connection to a PCB inside the end use equipment.
- f) The input fuse rating used during testing was: - F6.3AH 250V. The breaking capacity and voltage rating are subject to the end use application.
- g) Transformer T102 uses spirally wrapped triple insulated wire with class H insulation. Transformer T3 uses extruded triple insulated wire with class F insulation.
- h) The input to this product was considered to be DC provided from a non-isolated 250VAC source.
- i) The PAF450 is similar to the PAF600 except that the output power of the two products is 450W and 600W respectively. Due to similarities, only operational tests on the PAF600F280 were required, this being the worst case.

Testing Environment:

An ambient temperature in the range 15°C to 30°C

A relative humidity in the range 25% to 75%

An air pressure in the range 86 kPa to 106 kPa