



Test Report issued under the responsibility of:



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

Report Number.....: 1510056STO-001
Date of issue.....: 19 August 2015
Total number of pages.....: 65 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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General disclaimer:

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Test item description.....: DC-DC Converter
Trade Mark.....: TDK-Lambda
Manufacturer.....: TDK-Lambda Corporation
Model/Type reference.....: PAH450S48-\*\* (see also "Models" page 3)
Ratings.....: DC 36-76V (see also "Models" page 3)

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

<b>Tests performed</b> (name of test and test clause): See test report	<b>Testing location:</b> See page 2
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**Summary of compliance with National Differences:**  
 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 plate: (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	V	A
PAH450S48-28	36-76	16.5	28	16
PAH450S48-48	36-76	16.5	48	9.4
PAH450S48-132	43.2-52.8	12.5	132	2.2

All models may include suffix /T, corner studs are not threaded with an inside diameter of 0.1mm less than standard model.

<b>Test item particulars.....:</b>	
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 .....	Not applicable, Voltage range 36-76Vdc max.
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) .....	N/A (for building-in)
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) .....	<0.100
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.....	-
<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.          The test results and all data in this report are derived from previously issued Test Report No. 1218093-01 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.          Test results in this report are based on the previously issued test reports from BSI with ref. Nos. 249/4916427, 249/7029714, 249/7073838, 249/7278892 Based on reports from SET Laboratory with report number SMTN0142, SMTN0146, SMTN0149, SMTN0155.          Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	

<b>Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:</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 checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>		
<b>When differences exist; they shall be identified in the "General product information" section.</b>			
<b>Name and address of factories.....</b>	: TDK-Lambda (Malaysia) Sdn. Bhd. PLO33 Locked Bag No. 110 Kawasan Perindustrian Senai 81400 Senai Johor, Darul Takzim, <b>MALAYSIA</b>  TDK-Lambda Corporation Nagaoka Technical Center 2704-1 Settaya-machi, Nagaoka, Niigata 940-1195, <b>JAPAN</b>  Wuxi TDK-Lambda Electronics Co., Ltd. No.6 Xing Chuang Er lu Wuxi Jiangsu, 214028 <b>CHINA</b>		
<b>Abbreviations used in the report:</b>			
- normal conditions	<b>N.C.</b>	- single fault conditions	<b>S.F.C</b>
- functional insulation	<b>OP</b>	- basic insulation	<b>BI</b>
- double insulation	<b>DI</b>	- supplementary insulation	<b>SI</b>
- between parts of opposite polarity	<b>BOP</b>	- reinforced insulation	<b>RI</b>
Indicate used abbreviations (if any)			

This Test Report replaces previously issued, see table below.

#### REVISION TABLE

Date	Report ref.	Clause	Modification of the appliance
19 August 2015	1510056STO-001	-	Basic Test Report

**General Product Information:**

- a) These products shall be installed in accordance with the requirements of IEC 60950-1, EN 60950-1 for the end use application. The DC to DC converters were tested with the heat sink mounted below the base plate of the converters (worst case).
- b) The input to the units must be isolated from the mains by Reinforced insulation. This product provides Basic insulation at working voltage between the input and output. The DC to DC converter base plate shall be properly bonded to earth ground in the end use product as this unit was investigated for Class I construction.  
The 28Vdc output model is classed as SELV and the 48V model is classed as ELV providing the input positive and output positive are not grounded at the same time.  
Both the 28Vdc model and the 48Vdc model have an energy hazard. For this reason, the outputs must not be accessible to an operator.  
T101 barrier transformer has an insulation system class H.
- c) The operation of these DC to DC converters is subject to the end customer maintaining the base plate at or below the following values during operation.  
100 degrees C base plate, 100 percent load.
- d) The DC to DC converters have not been assessed for an IT power system.
- 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 recommended input fuse ratings within the instructions were as follows:-  
F30AH 250V  
# the breaking capacity and voltage rating are subject to the end use application.
- g) The potting material used within these models is used for thermal reasons and not for reduction of spacing's

**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