Test Report issued under the responsibility of:

TEST REPORT

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

Report Number. .....:	1510058STO-001
Date of issue .....:	29 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

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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.

TEST REPORT issued by an Accredited Testing Laboratory. Accredited by Swedac, no 1003, ISO/IEC 17025.

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.

Test item description .....:	DC-DC Converters	
Trade Mark .....:	**TDK-Lambda**	
Manufacturer.....:	TDK-Lambda Corporation	
Model/Type reference .....:	PAH75D24-****, PAH75D48-****	(see also "*Models*" page 4)
Ratings .....:	DC 18-36V⎓ , DC 36-76V⎓	(see also "*Models*" page 4)

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	**Intertek Semko AB**	
Testing location/ address ..... :		Torshamnsgatan 43, P.O. Box 1103, SE-164 22 Kista, SWEDEN	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :		Bedran Nergiz	Bedran Nergiz
Approved by (name + signature)..... :		Anna Karin Cedergren	Cedergren
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Approved by (name + signature)..... :			
☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name + signature) ..... :			
Approved by (name + signature)..... :			
☐	**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) ..... :			

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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:

☒ 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: (example)

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_{max}	V	A_{max}	O/P Power
PAH75D48-5033	36-76	2.86	3.3	15	75
	-	-	5.0	15	
PAH75D48-3325	36-76	2.86	2.5	15	60
	-	-	3.3	15	
PAH75D48-3318	36-76	2.86	1.8	15	50
	-	-	3.3	15	
PAH75D48-2518	36-76	2.86	1.8	15	45
	-	-	2.5	15	
PAH75D24-5033	18-36	5.7	3.3	15	75
	-	-	5.0	15	
PAH75D24-3325	18-36	5.7	2.5	15	60
	-	-	3.3	15	

Maximum output power for each model, not exceed the values tabulated above.
Maximum baseplate temperature not exceeds 100°C.

Model Differences:

Model PAH75D48-5033 is the base Model.

Models PAH75D48-3325, PAH75D48-3318, PAH75D48-2518 are similar to Model PAH75D48-5033, differing only in the output ratings and Transformer T102.
Models with suffix /Z are similar to the basic models, differing only in the provision of modified output trim circuitry, which is not safety related.

Models PAH75D24-5033 and PAH75D24-3325 are similar to Models PAH75D48-5033 and PAH75D48-3325, respectively, differing only in various primary component values and transformer windings, for operation at an input voltage of 24Vdc, which are not safety related.

Suffix options PAH75D48-5033 /x where x is any suffix below.

Suffix	On/Off Control	Pin Length	OVP	OTP	Stud
-	Negative	5.08	Manual Reset	Auto Reset	with Treads
P	Positive	N/A	N/A	N/A	N/A
2	N/A	2.79	N/A	N/A	N/A
3	N/A	3.68	N/A	N/A	N/A
H	N/A	N/A	N/A	Manual Reset	N/A
V	N/A	N/A	Auto Restart	N/A	N/A
T	N/A	N/A	N/A	N/A	without threads

Test item particulars.....:	
Equipment mobility.....:	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains.....:	[] pluggable equipment [] type A [] type B [x] permanent connection [] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [] restricted access location [x] for building into a host equipment
Over voltage category (OVC) .....:	[] OVC I [x] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values .....:	Not applicable. Voltage range 18-36Vdc max or 36-76Vdc max.
Tested for IT power systems .....:	[] Yes [x] No
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	[x] Class I [] Class II [] Class III [] Not classified
Considered current rating of protective device as part of the building installation (A) .....:	16
Pollution degree (PD) .....:	[] PD 1 [x] PD 2 [] 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.....:	See "*General remarks*" below

General remarks:

"(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. 1218094 dated 3 September 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 ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
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 .....:	☒ Yes ☐ 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
29 Oct. 2015	1510058STO-001	-	Basic Test Report

General Product Information:

- 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 heatsink mounted below the baseplate of the converters (worst case).

- The equipment has been evaluated for use in a pollution Degree 2 environment.

- Consideration shall be given to measuring the temperature on power electronic components, inductors and transformer windings when the power supply is installed in the end use equipment. Transformer T102 employs a Class F (155) insulation system and T1 employs a Class B (130) insulation system. Transformer T101 is of the planar type, which employs printed wiring and a copper strip as primary and secondary windings. The copper strip is wrapped with R/C OANZ2 polyimide (Kapton) tape. The PWB's and polyimide tape are rated 130°C min. It must be ensured that the baseplate temperature does not exceed 100 degrees Celsius. This temperature limit governs the working ambient temperature.

- The input to the units must be isolated from the mains by reinforced insulation in accordance with EN60950-1 and IEC60950-1 in order to maintain a SELV output. Due to the potential non-SELV voltages at the input of the PAH75D48 Series, the input to these units must be considered hazardous secondary voltage. This is not applicable to the PAH75D24 Series. Outputs were determined to be SELV.

- This power supply shall be properly bonded to earth ground in the end use product as this unit was investigated for Class I construction.
  The recommended input fuse rating within the instructions, and the fuse used for testing is as follows:
  PAH75D24 = F10AH, 250 V
  PAH75D48 = F5AH, 250V.

- The breaking capacity and voltage rating are subject to the end use application.

- These products were assessed for basic insulation at working voltage between input and output. All fault testing across the barriers was conducted under all input and output earth combinations.

- 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.

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