Test Report issued under the responsibility of:

TEST REPORT

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

Report Number. .....:	1510039STO-001
Date of issue .....:	14 September 2015
Total number of pages.....	87 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 Converter
Trade Mark .....:	**TDK-Lambda**
Manufacturer.....:	TDK-Lambda Corporation
Model/Type reference .....:	PA*50S48-**, PA*75S48-**, PA*100S48-**, PA*150S48-**, PA*150S48-24/ZX (see also "*Models*" page 4)
Ratings .....:	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).....:			

Intertek Semko AB
Torshamnsgatan 43, Box 1103, SE-164 22 Kista, Sweden
Telephone +46 8 750 00 00, Fax +46 8 750 60 30
www.intertek.se
Registered in Sweden: No: SE556024059901, Registered office: As address

Summary of testing:	
Tests performed (name of test and test clause): See test report	**Testing location:** See page 2

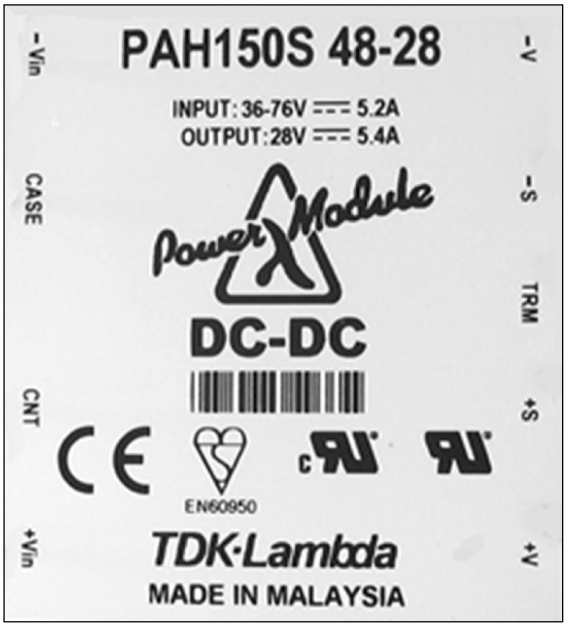
Summary of compliance with National Differences:

☒ 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.



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Models included within the scope of this report				
Model	Input, AC		Output, DC	
-	V	A_{max}	V	A_{max}
PA or PAH150S48-2.5	36-76	5.2	2.5	35
PA or PAH150S48-3.3	36-76	5.2	3.3	35
PA or PAH150S48-5	36-76	5.2	5	30
PA or PAH150S48-12	36-76	5.2	12	12.5
PA or PAH150S48-15	36-76	5.2	15	10
PA or PAH150S48-24	36-76	5.2	24	6.3
PA or PAH150S48-24/ZX	36-76	5.2	26	5.8
PA or PAH150S48-28	36-76	5.2	28	5.4
PA or PAH100S48-2.5	36-76	3.5	2.5	23.4
PA or PAH100S48-3.3	36-76	3.5	3.3	23.4
PA or PAH100S48-5	36-76	3.5	5	20
PA or PAH100S48-12	36-76	3.5	12	8.4
PA or PAH100S48-15	36-76	3.5	15	6.7
PA or PAH100S48-24	36-76	3.5	24	4.2
PA or PAH100S48-28	36-76	3.5	48	3.6
PA or PAH75S48-2.5	36-76	2.7	2.5	17.5
PA or PAH75S48-3.3	36-76	2.7	3.3	17.5
PA or PAH75S48-5	36-76	2.7	5	15
PA or PAH75S48-12	36-76	2.7	12	6.3
PA or PAH75S48-15	36-76	2.7	15	5
PA or PAH75S48-24	36-76	2.7	24	3.2
PA or PAH75S48-28	36-76	2.7	48	2.7
PA or PAH50S48-2.5	36-76	1.9	2.5	11.7
PA or PAH50S48-3.3	36-76	1.9	3.3	11.7
PA or PAH50S48-5	36-76	1.9	5	10
PA or PAH50S48-12	36-76	1.9	12	4.2
PA or PAH50S48-15	36-76	1.9	15	3.4
PA or PAH50S48-24	36-76	1.9	24	2.1
PA or PAH50S48-28	36-76	1.9	28	1.8
All above loading conditions are maximum at 100°C baseplate.				

Suffix	On/Off Control	Pin Length	OVP	OTP	Stud
–	Negative	5.08	Manual Reset	Auto Reset	With Threads
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
T	N/A	N/A	N/A	N/A	Without Threads
H	N/A	N/A	N/A	Manual Reset	N/A
V	N/A	N/A	Auto Reset	N/A	N/A
U	N/A	N/A	Auto Reset	N/A	N/A
These suffixes may be used together (e.g. /PV, /HTPV3) Suffix U denotes different Input/Output terminal connector.					

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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 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) .....:	N/A (for building-in)
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) .....:	<0.300
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:	
"(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. 1218077 dated 30 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 ☐ comma / ☒ point is used as the decimal separator.	

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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
14 Sept. 2015	1510039STO-001	-	Basic Test Report

Intertek Semko AB
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General Product Information:

a) The input to the units must be isolated from the mains by reinforced insulation in accordance with EN60950-1and IEC60950-1 in order to maintain a SELV output.

b) Transformers T101 and T102 employ a Class 155(F) for Models PA or PAH150S48-3.3, -5 PA or PAH100S48-3.3, -5, PA or PAH75S48 3.3, -5, -12, -15, -24, -28 and PA or PAH50S48-3.3, -5, 12, -15, -24, -28 and Class 180(H) for Models PA or PAH150S48-12, -15, -24, -24/ZX, -28. PA or PAH100S48-12, -15, 24, 28.
All temperature tests have been conducted with heat sinks 146 by 86 by 24 mm and 86 by 83 by 24 mm. The baseplate of the modules should not exceed 100°C.

c) This power supply shall be properly bonded to earth ground in the end use product as this unit was investigated for Class I construction.

d) Tests were performed with an external listed input fuse, rated maximum F10AH, 250V for PA or PAH150S48 Series. F7AH, 250V for PA or PAH100S48 Series. F5AH, 250V for PA or PAH75S48 Series and PA or PAH50S48 Series. The breaking capacity and voltage rating are subject to the end use application.

e) The input and output connectors are not acceptable for field wiring connections and are only intended for connection to a PWB inside the end use equipment.

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

g) Subject to the above, all secondary output circuits are SELV. No secondary energy hazard existed for any of the outputs.

h) For testing purposes, the PA models were considered to have the same operating characteristics as the PAH models. The PA, PAH75S48 were considered to be similar to the PA, PAH50S48 models and the PA, PAH150S48 were considered to be similar to the PA, PAH100S48 models.

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

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