

Test Report issued under the responsibility of:



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

Report Number: 1510047STO-001
 Date of issue: 28 September 2015
 Total number of pages: 83 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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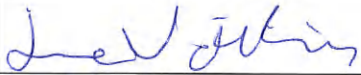
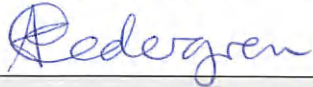
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

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	PH50S280-*/**, PH75S280-*/**, PH100S280-*/**, PH150S280-*/** (see also "Models" page3- 4)
Ratings	200–400V==

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)		Janne Vähämäki 
Approved by (name + signature).....		Anna Karin Cedergren 
<hr/>		
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:	
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature).....		
<hr/>		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name + signature)		
Approved by (name + signature).....		
<hr/>		
<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)		

List of Attachments (including a total number of pages in each attachment):

Page 1 – 49: Test report
 Page 50 – 68: Group and national differences for the European countries.
 Page 69 - 82: Photos including illustrations
 Page 83: Max overall uncertainty

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.



Model	Input		Output	
	V dc	A	V dc	A
PH50S280-3.3	200-400	0.32	3.3	10
PH50S280-5	200-400	0.32	5	10
PH50S280-12	200-400	0.32	12	4.2
PH50S280-15	200-400	0.32	15	3.4
PH50S280-24	200-400	0.32	24	2.1
PH50S280-28	200-400	0.32	28	1.8
PH75S280-3.3	200-400	0.47	3.3	15
PH75S280-5	200-400	0.47	5	15
PH75S280-12	200-400	0.47	12	6.3
PH75S280-15	200-400	0.47	15	5
PH75S280-24	200-400	0.47	24	3.2
PH75S280-28	200-400	0.47	28	2.7
PH100S280-5	200-400	0.63	5	20
PH100S280-12	200-400	0.63	12	8.4

TRF No. IEC60950_1F

Intertek Semko AB

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www.intertek.se

Registered in Sweden: No: SE556024059901, Registered office: As address

PH100S280-15	200-400	0.63	15	6.7
PH100S280-24	200-400	0.63	24	4.2
PH100S280-28	200-400	0.63	28	3.6
PH150S280-5	200-400	0.94	5	30
PH150S280-12	200-400	0.94	12	12.5
PH150S280-15	200-400	0.94	15	10
PH150S280-24	200-400	0.94	24	6.3
PH150S280-28	200-400	0.94	28	5.4

Models with the suffix /BC are identical to the original models described in this report, except for minor changes to the resistance values of the feedback circuit.

Models with the suffix /BC1 are the same as models with suffix BC, except for omission of secondary-to-ground capacitor, C110.

Models with the suffix /HKM are provided for commercial reasons.

Models with the suffix /PI are identical to the original models described in this report, except that the corner studs are non-threaded - standard models, without suffix /PI, are provided with threaded corner studs.

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	Not applicable, Voltage range 200-400Vdc.
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. 1017571 dated 19 August 2010, and Test Report No. 1218109 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)			

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.

1. 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).
2. 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. Subject to application, this may not be necessary.
3. This product must be installed within a host equipment and only be accessible to authorised competent personnel. These products were assessed for reinforced insulation between input and output and basic insulation between input and earth assuming a 250Vac mains supply. These converters may have a mains derived DC supply attached to the input and provide a SELV output. To maintain the SELV output under fault conditions, the output must be connected to earth in the final application.
4. The operation of these DC to DC converters is subject to the end customer maintaining the baseplate at 85°C or below during operation except for /BC models where the baseplate can be 95°C.
5. 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.
6. The recommended input fuse ratings within the instructions were as follows:-
 PH50S/PH75S280-**/** = F1AH, 250V
 PH100S280-**/** = F1.5AH or F2AH, 250V
 PH150S280-**/** = F2AH, 250V
 The breaking capacity and voltage rating are subject to the end use application
7. T1, T101/T102 use triple insulated wire with an insulation class for the Transformers of F or H. The baseplate temperature must not exceed 85 degrees Celsius for standard models and 95°C for /BC models. This temperature limit governs the working ambient temperature.
 Ratings:-
 PH50S/PH75S280-**/** 100% load, 85°C baseplate.
 PH100S280-**/** 100% load, 85°C baseplate.
 PH150S280-**/** 100% load, 85°C baseplate.

Testing Environment:

An ambient temperature in the range 15°C to 25°C

A relative humidity in the range 25% to 75%

An air pressure in the range 86 kPa to 106 kPa